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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2582A	1	12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34472.1.4 (R-2582A)* F.A. PROJ. *NHF-158(7)*

COUNTY *NORTHAMPTON*

PROJECT DESCRIPTION *US 158 FROM I-95/NC 46 IN ROANOKE RAPIDS TO SR 1312 (ST. JOHN CHURCH RD)*

SITE DESCRIPTION *DUAL BRIDGES NO. 124 AND 125 ON -L- (US 158) OVER -Y9- (US 301) AT -L- STA. 198+42.23*

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GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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PERSONNEL

J.D. GEMPERLINE

TERRACON PERSONNEL

INVESTIGATED BY *T.C. BOTTOMS*

CHECKED BY *D.N. ARGENBRIGHT*

SUBMITTED BY *D.N. ARGENBRIGHT*

DATE *SEPTEMBER 2014*

NORTH CAROLINA LICENSED SEAL 1050 GEOLOGIST D.N. ARGENBRIGHT

DocuSigned by: Dean N. Argenbright F83EDC63E4B74F8... 7/19/2017

DRAWN BY: *C.P. TURNER*

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PROJECT: 34472.1.4

ID: R-2582A

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	2 OF 12

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	< 4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	> 50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	< 2	< 0.25
	SOFT	2 TO 4	0.25 TO 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	> 30	> 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- ▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- ▼ STATIC WATER LEVEL AFTER 24 HOURS
- ▽PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT / CPT / DMT / VST / PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT EXCAVATION
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] TER-255
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT. THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM TAKEN FROM ROADWAY PROFILE EXISTING GROUNDLINE
-L- STA. 198+00 CL
ELEVATION: 101.39 FEET

NOTES:

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET
R-2582A	3 OF 12

SITE PLAN

0 30 60
FEET

N

F F F F

198

-L- POT Sta. 198+42.23 =
-Y9- POT Sta. 25+04.76

EB1-A

9' GR

CONC

EB2-A

GR

GR

-Y9LPA- ST Sta. 10+00.00
-L- POT Sta. 199+94.54
OFFSET -47

200

F F

TO I-95

TO SR 1312

-L-

25

SKEW = 90° 15' 39"

EB1-B

EB2-B

-Y9LPD- ST
Sta. 10+00.00

10' GR

F F

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	4 OF 12

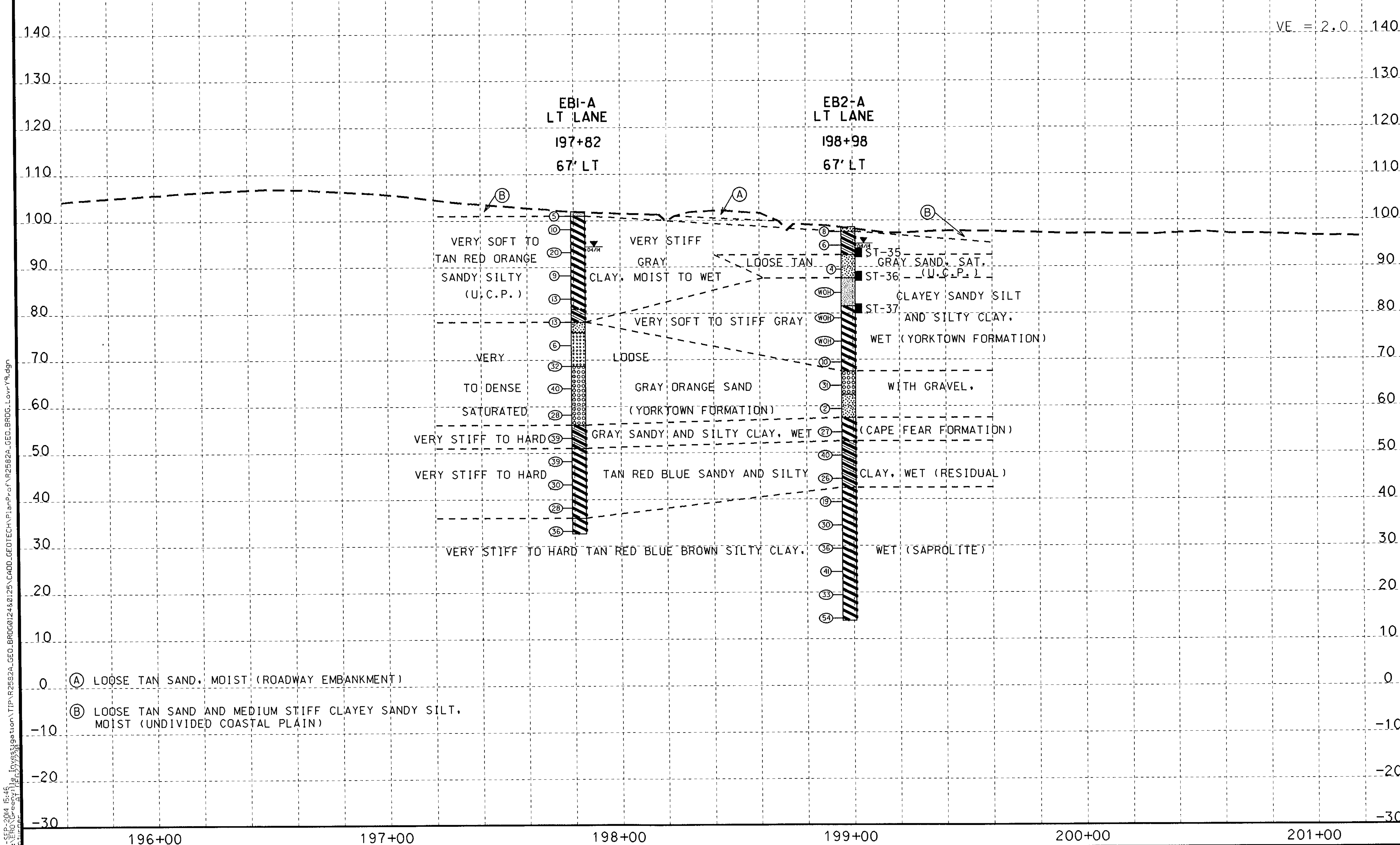
ROADWAY DESIGN ENGINEER.

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH WESTBOUND LANE BORINGS PROJECTED ALONG -L-



PROJECT REFERENCE NO.	SHEET NO.
R-2582A	5 OF 12

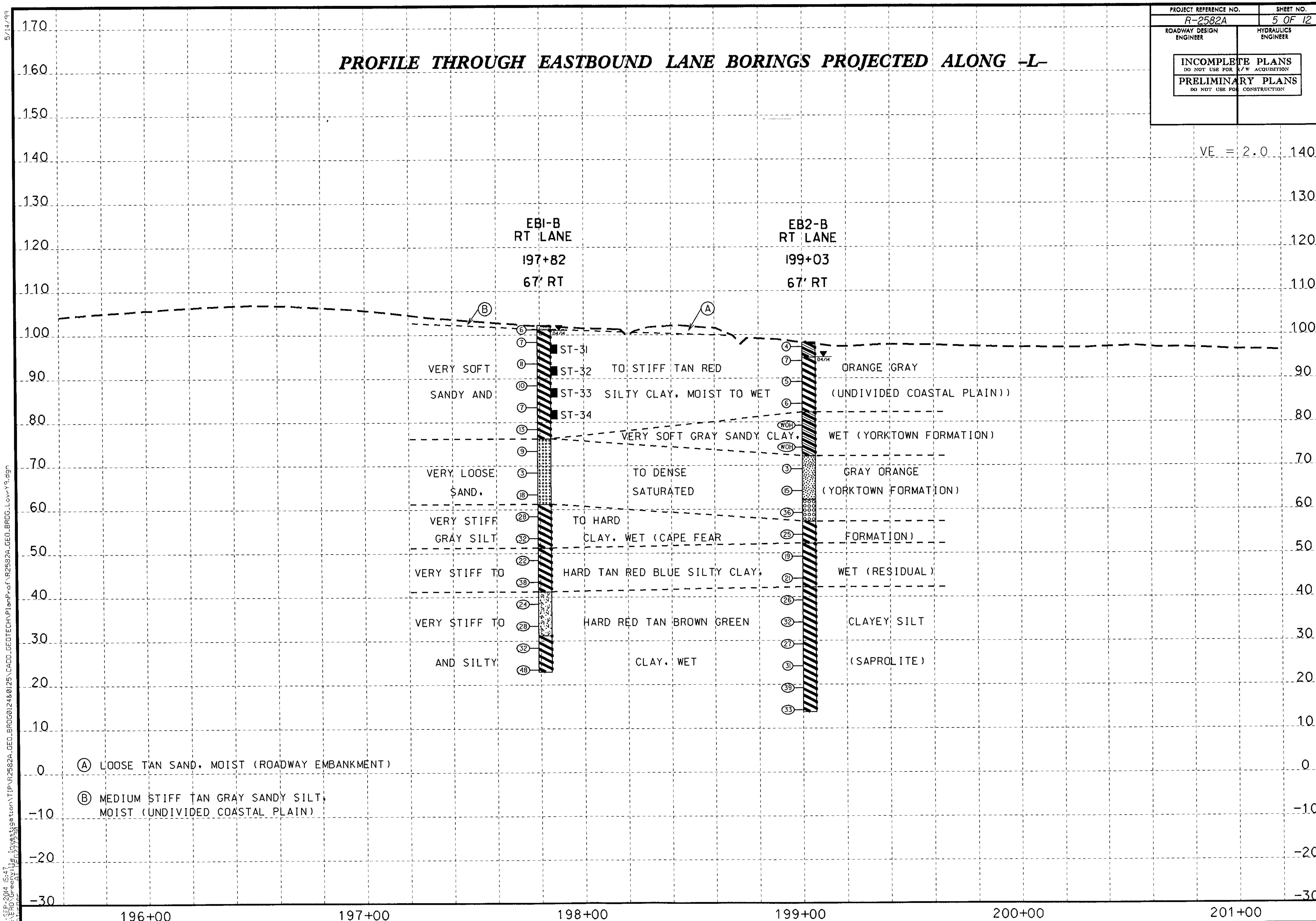
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH EASTBOUND LANE BORINGS PROJECTED ALONG -L-



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CROSS SECTION THROUGH END BENT 1 BENT LINE

EBI-A
LT LANE
197+82
67' LT

EBI-B
RT LANE
197+82
67' RT

(A)

MEDIUM STIFF TO VERY STIFF TAN RED ORANGE GRAY
SANDY AND SILTY CLAY, MOIST TO WET
(UNDIVIDED COASTAL PLAIN)

VERY LOOSE TO DENSE GRAY ORANGE SAND
WITH GRAVEL, SATURATED (YORKTOWN FORMATION)

VERY STIFF TO HARD SANDY AND SILTY CLAY,
WET (CAPE FEAR FORMATION)

VERY STIFF TO HARD TAN RED BLUE
SILTY CLAY, WET (RESIDUAL)

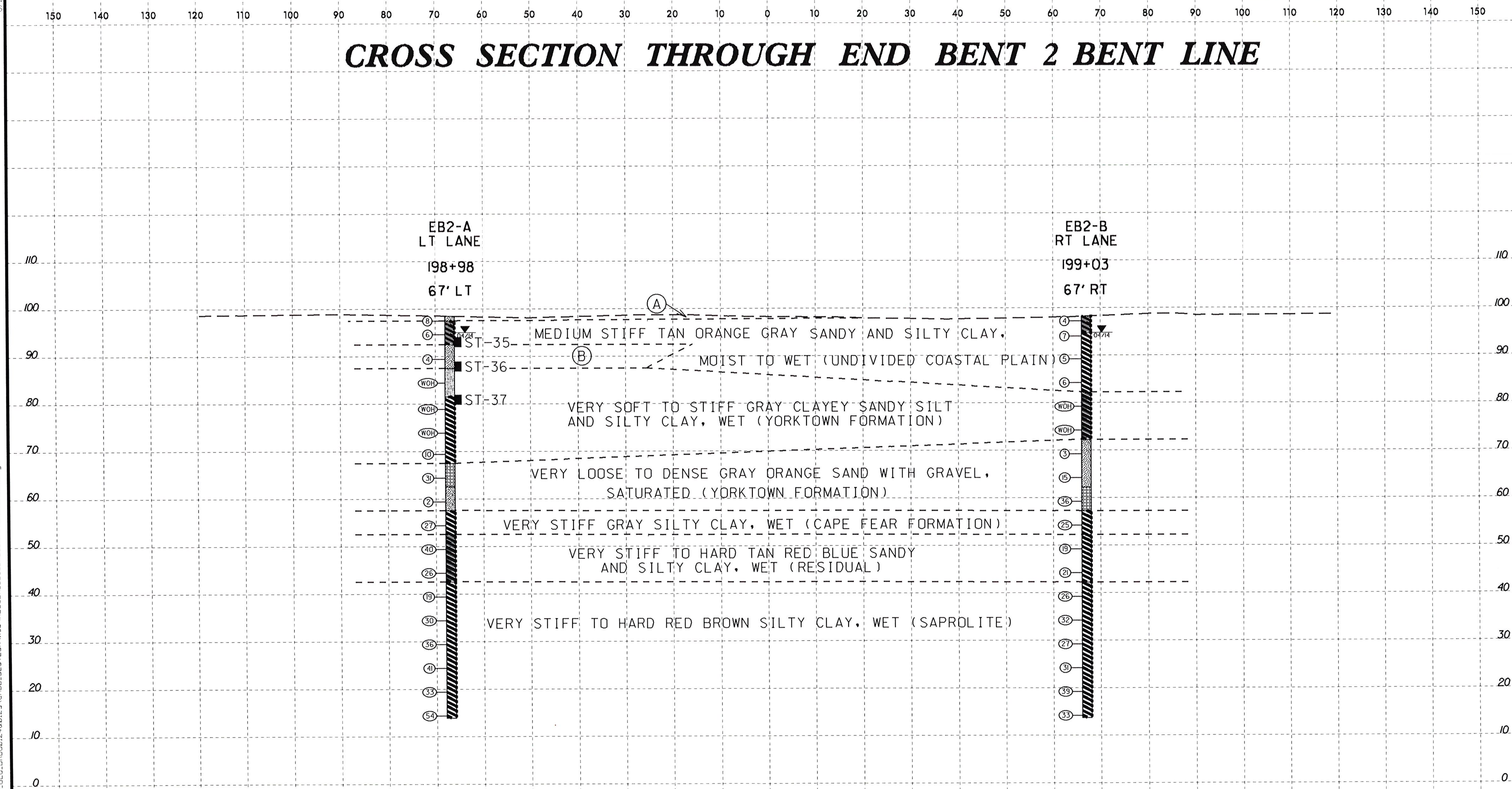
VERY STIFF TO HARD TAN RED BLUE GREEN CLAYEY SILT
AND SILTY CLAY, WET (SAPROLITE)

ST-31
ST-32
ST-33
ST-34

(A) MEDIUM STIFF TAN CLAYEY SANDY SILT, MOIST
(UNDIVIDED COASTAL PLAIN)

197+82.25

CROSS SECTION THROUGH END BENT 2 BENT LINE



(A) LOOSE TAN SAND, MOIST (UNDIVIDED COASTAL PLAIN)

(B) LOOSE TAN GRAY SAND, SATURATED (UNDIVIDED COASTAL PLAIN)

198+98.00

-L-

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 125 ON -L- (US 158) OVER -Y9- (US 301)				**GROUND WTR (ft)**
BORING NO. EB1-A LT.LN.	**STATION** 197+82	**OFFSET** 67 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 102.0 ft	**TOTAL DEPTH** 69.3 ft	**NORTHING** 982,232	**EASTING** 2,421,039	**24 HR.** 7.6
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 76% 02/25/2014		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER N/A	**START DATE** 04/15/14	**COMP. DATE** 04/15/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
105	102.0	0.0								102.0 GROUND SURFACE 0.0
			3	3	2	5	SS-721			101.0 **UNDIVIDED COASTAL PLAIN** 1.0 TAN CLAYEY SANDY SILT, MOIST
100	99.1	2.9	3	3	7	10	SS-722	30%		**UNDIVIDED COASTAL PLAIN** TAN RED ORANGE GRAY SANDY AND SILTY CLAY, MOIST TO WET
95	94.2	7.8	4	7	13	20				
90	89.2	12.8	3	3	6	9	SS-723			
85	84.2	17.8	3	5	8	13				
80	79.2	22.8	5	7	6	13	SS-724	24%		81.0 21.0 78.2 23.8
75	74.2	27.8	4	3	3	6	SS-725			76.0 26.0 **COASTAL PLAIN** GRAY ORANGE SAND WITH GRAVEL, SAT. (YORKTOWN FORMATION)
70	69.2	32.8	4	14	18	32	SS-726			68.7 33.3
65	64.9	37.1	30	22	18	40				
60	59.2	42.8	12	13	15	28	SS-727			
55	54.2	47.8	12	17	22	39	SS-728	14%		56.0 46.0 **COASTAL PLAIN** GRAY SANDY CLAY, WET (CAPE FEAR fORMATION)
50	49.2	52.8	9	17	22	39				51.0 51.0 **RESIDUAL** TAN RED BLUE SILTY CLAY, WET
45	44.2	57.8	7	12	18	30	SS-729			
40	39.2	62.8	6	11	17	28				
35	34.2	67.8	9	14	22	36	SS-730			36.0 66.0 **SAPROLITE** TAN RED BLUE SILTY CLAY, WET 32.7 69.3 Boring Terminated at Elevation 32.7 ft in Hard Saprolitic Clay

NCDOT BORE DOUBLE R-2582A_GEO_BRDG_Y9 124_125.GPJ NC_DOT.GDT 9/18/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 124 ON -L- (US 158) OVER -Y9- (US 301)				**GROUND WTR (ft)**
BORING NO. EB1-B RT.LN.	**STATION** 197+82	**OFFSET** 67 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 102.2 ft	**TOTAL DEPTH** 79.3 ft	**NORTHING** 982,169	**EASTING** 2,420,920	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 76% 02/25/2014		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER N/A	**START DATE** 04/15/14	**COMP. DATE** 04/16/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
105	102.2	0.0	2	4	2	6				102.2 GROUND SURFACE 0.0
										101.2 **UNDIVIDED COASTAL PLAIN** 1.0
100	99.3	2.9	2	3	4	7	SS-731	33%		TAN GRAY SANDY SILT, MOIST
										UNDIVIDED COASTAL PLAIN
95	94.4	7.8	5	5	6	11				TAN RED ORANGE GRAY SILTY CLAY, MOIST TO WET
90	89.4	12.8	4	4	6	10	SS-732	29%		
85	84.4	17.8	3	4	3	7				
80	79.4	22.8	4	5	8	13	SS-733			
75	74.4	27.8	3	4	5	9				76.2 26.0
70	69.4	32.8	2	2	1	3	SS-734			**COASTAL PLAIN** GRAY ORANGE SAND WITH GRAVEL, SAT (YORKTOWN FORMATION)
65	64.4	37.8	16	10	8	18				
60	59.4	42.8	9	11	17	28	SS-735			61.2 41.0
55	54.4	47.8	13	14	18	32				**COASTAL PLAIN** GRAY SILTY CLAY, WET (CAPE FEAR FORMATION)
50	49.4	52.8	6	9	13	22	SS-736			51.2 51.0
45	44.4	57.8	7	16	22	38				**RESIDUAL** TAN RED BLUE SILTY CLAY, WET
40	39.4	62.8	6	11	13	24	SS-737			41.2 61.0
35	34.4	67.8	5	10	18	28				**SAPROLITE** RED BLUE CLAYEY SILT, WET
30	29.4	72.8	8	14	18	32	SS-738			31.2 71.0
25										**SAPROLITE** RED TAN GREEN SILTY CLAY, WET

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 124 ON -L- (US 158) OVER -Y9- (US 301)				**GROUND WTR (ft)**
BORING NO. EB1-B RT.LN.	**STATION** 197+82	**OFFSET** 67 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 102.2 ft	**TOTAL DEPTH** 79.3 ft	**NORTHING** 982,169	**EASTING** 2,420,920	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 76% 02/25/2014		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER N/A	**START DATE** 04/15/14	**COMP. DATE** 04/16/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
25	24.4	77.8	9	18	30	Match Line 48				22.9 79.3

Boring Terminated at Elevation 22.9 ft in Hard Saprolitic Clay

Other Samples:
ST-31 (4.5 - 6.5)
ST-32 (9.5 - 11.5)
ST-33 (14.5 - 16.5)
ST-34 (19.5 - 21.5)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 125 ON -L- (US 158) OVER -Y9- (US 301)				**GROUND WTR (ft)**
BORING NO. EB2-A LT.LN.	**STATION** 198+98	**OFFSET** 67 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 98.5 ft	**TOTAL DEPTH** 84.6 ft	**NORTHING** 982,130	**EASTING** 2,421,093	**24 HR.** 3.5
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 76% 02/25/2014		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER N/A	**START DATE** 04/17/14	**COMP. DATE** 04/17/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) — DEPTH (ft)
100	98.5	0.0	4	4	4	8	SS-749			98.5 — 0.0 GROUND SURFACE
										97.5 — 1.0 **UNDIVIDED COASTAL PLAIN** TAN SAND, MOIST
95	95.6	2.9	2	2	4	6	SS-750	26%		**UNDIVIDED COASTAL PLAIN** GRAY ORANGE SANDY CLAY, MOIST TO WET
										92.5 — 6.0 **UNDIVIDED COASTAL PLAIN** TAN GRAY SAND, SAT.
90	90.4	8.1	2	2	2	4	SS-751			
85	85.4	13.1	WOH	WOH	WOH	0	SS-752	37%		87.5 — 11.0 **COASTAL PLAIN** GRAY CLAYEY SANDY SILT, WET (YORKTOWN FORMATION)
80	79.9	18.6	WOH	WOH	WOH	0	SS-753			81.5 — 17.0 **COASTAL PLAIN** GRAY SILTY CLAY, WET (YORKTOWN FORMATION)
75	74.9	23.6	WOH	WOH	WOH	0				
70	70.4	28.1	WOH	3	7	10				
65	65.4	33.1	26	21	10	31	SS-754			67.5 — 31.0 **COASTAL PLAIN** GRAY ORANGE SAND WITH GRAVEL, SAT. (YORKTOWN FORMATION)
60	60.4	38.1	2	1	1	2	SS-755	25%		62.5 — 36.0
55	55.4	43.1	9	12	15	27				57.5 — 41.0 **COASTAL PLAIN** GRAY SILTY CLAY, WET (CAPE FEAR FORMATION)
50	50.4	48.1	11	15	25	40	SS-756			52.5 — 46.0 **RESIDUAL** TAN RED BLUE SANDY CLAY, WET
45	45.4	53.1	6	10	16	26				
40	40.4	58.1	5	7	12	19	SS-757			42.5 — 56.0 **SAPROLITE** RED BROWN SILTY CLAY, WET
35	35.4	63.1	8	12	18	30				
30	30.4	68.1	7	14	22	36	SS-758			
25	25.4	73.1	11	13	28	41				
20	20.4	78.1								

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 125 ON -L- (US 158) OVER -Y9- (US 301)				**GROUND WTR (ft)**
BORING NO. EB2-A LT.LN.	**STATION** 198+98	**OFFSET** 67 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 98.5 ft	**TOTAL DEPTH** 84.6 ft	**NORTHING** 982,130	**EASTING** 2,421,093	**24 HR.** 3.5
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 76% 02/25/2014		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER N/A	**START DATE** 04/17/14	**COMP. DATE** 04/17/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
20						Match Line				
			9	13	20	33	SS-759			**SAPROLITE** RED BROWN SILTY CLAY, WET *(continued)*
15	15.4	83.1	16	19	35	54				13.9 — 84.6 Boring Terminated at Elevation 13.9 ft in Hard Saprolitic Clay

Other Samples:
ST-35 (4.5 - 6.5)
ST-36 (9.6 - 11.6)
ST-37 (16.6 - 18.6)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 124 ON -L- (US 158) OVER -Y9- (US 301)				**GROUND WTR (ft)**
BORING NO. EB2-B RT.LN.	**STATION** 199+03	**OFFSET** 67 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 98.2 ft	**TOTAL DEPTH** 84.5 ft	**NORTHING** 982,063	**EASTING** 2,420,977	**24 HR.** 3.4
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 76% 02/25/2014		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER N/A	**START DATE** 04/16/14	**COMP. DATE** 04/16/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
100												
	98.2	0.0								GROUND SURFACE	98.2	0.0
			2	2	2	4	SS-739					
95	95.0	3.2									94.7	3.5
			2	2	5	7				**UNDIVIDED COASTAL PLAIN** TAN ORANGE GRAY SANDY AND SILTY CLAY, MOIST TO WET		
90	90.2	8.0										
			2	2	3	5	SS-740	31%				
85	85.2	13.0										
			WOH	3	3	6						
80	80.2	18.0									82.2	16.0
			WOH	WOH	WOH	0	SS-741	37%		**COASTAL PLAIN** GRAY SILTY CLAY, WET (YORKTOWN FORMATION)		
75	75.2	23.0										
			WOH	WOH	WOH	0						
70	70.2	28.0									72.2	26.0
			5	1	2	3	SS-742			**COASTAL PLAIN** GRAY ORANGE SAND WITH GRAVEL, SAT. (YORKTOWN FORMATION)		
65	65.2	33.0										
			5	7	8	15						
60	60.2	38.0									62.2	36.0
			25	26	10	36	SS-743					
55	55.2	43.0									57.2	41.0
			6	10	15	25	SS-744			**COASTAL PLAIN** GRAY SILTY CLAY, WET (CAPE FEAR FORMATION)		
50	50.2	48.0									52.2	46.0
			7	8	11	19				**RESIDUAL** TAN RED BLUE SILTY CLAY, WET		
45	45.2	53.0										
			5	9	12	21	SS-745					
40	40.2	58.0									42.2	56.0
			5	10	16	26				**SAPROLITE** RED BROWN SILTY CLAY, WET		
35	35.2	63.0										
			6	11	21	32	SS-746					
30	30.2	68.0										
			5	7	20	27						
25	25.2	73.0										
			5	10	21	31	SS-747					
20	20.2	78.0										

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 124 ON -L- (US 158) OVER -Y9- (US 301)				**GROUND WTR (ft)**
BORING NO. EB2-B RT.LN.	**STATION** 199+03	**OFFSET** 67 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 98.2 ft	**TOTAL DEPTH** 84.5 ft	**NORTHING** 982,063	**EASTING** 2,420,977	**24 HR.** 3.4
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 76% 02/25/2014		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER N/A	**START DATE** 04/16/14	**COMP. DATE** 04/16/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
20						Match Line						
			8	15	24	39				**SAPROLITE** RED BROWN SILTY CLAY, WET *(continued)*		
15	15.2	83.0										
			9	12	21	33	SS-748				13.7	84.5
										Boring Terminated at Elevation 13.7 ft in Hard Saprolitic Clay		

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	12 OF 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

34472.1.4
R-2582A
DUAL BRIDGES NO. 124 AND 125 ON -L- (US 158) OVER -Y9- (US 301)

EB1-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-721	67 LT	197+82	0.0-1.0	A-4(2)	25	8	14.7	37.1	19.9	28.3	100	93	56	-	-
SS-722	67 LT	197+82	2.9-4.4	A-7-6(35)	63	36	2.4	13.3	21.7	62.6	100	99	87	30.1	-
SS-723	67 LT	197+82	12.8-14.3	A-7-6(18)	41	18	0.6	18.0	43.1	38.3	100	100	92	-	-
SS-724	67 LT	197+82	22.8-23.8	A-6(6)	29	15	18.2	28.9	22.7	30.3	100	91	59	24.4	-
SS-725	67 LT	197+82	23.8-24.3	A-2-4(0)	16	NP	50.7	30.5	8.8	10.1	100	77	22	-	-
SS-726	67 LT	197+82	32.8-33.3	A-3(0)	21	NP	26.4	61.2	4.3	8.1	70	63	10	-	-
SS-727	67 LT	197+82	42.8-44.3	A-1-b(0)	22	NP	67.2	17.2	7.6	8.1	84	45	15	-	-
SS-728	67 LT	197+82	47.8-49.3	A-6(2)	25	12	20.8	35.9	15.0	28.3	100	89	49	13.7	-
SS-729	67 LT	197+82	57.8-59.3	A-7-5(17)	56	23	19.8	13.3	16.4	50.5	100	89	69	-	-
SS-730	67 LT	197+82	67.8-69.3	A-7-5(10)	50	15	24.8	11.7	35.2	28.3	100	83	66	-	-

EB1-B SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-731	67 RT	197+82	2.9-4.4	A-7-6(30)	65	41	5.9	26.4	17.3	50.5	100	98	73	33.2	-
SS-732	67 RT	197+82	12.8-14.3	A-7-6(21)	44	19	0.2	9.3	46.1	44.4	100	100	96	28.8	-
SS-733	67 RT	197+82	22.8-24.3	A-7-6(20)	45	18	1.0	9.9	46.7	42.4	100	99	95	-	-
SS-734	67 RT	197+82	32.8-34.3	A-3(0)	18	NP	64.0	26.5	3.4	6.1	100	87	10	-	-
SS-735	67 RT	197+82	42.8-44.3	A-7-6(17)	46	31	17.6	22.2	19.9	40.4	100	93	63	-	-
SS-736	67 RT	197+82	52.8-54.3	A-7-5(26)	68	29	12.5	11.7	15.2	60.5	100	95	77	-	-
SS-737	67 RT	197+82	62.8-64.3	A-5(9)	46	9	14.1	13.9	33.6	38.3	100	94	75	-	-
SS-738	67 RT	197+82	72.8-74.3	A-7-5(9)	49	13	21.8	13.3	26.5	38.3	97	82	65	-	-

EB2-A SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-749	67 LT	198+98	0.0-1.0	A-2-4(0)	17	1	23.1	41.5	21.4	14.0	72	63	30	-	-
SS-750	67 LT	198+98	2.9-4.4	A-6(6)	37	18	5.0	46.1	14.7	34.1	100	99	53	25.6	-
SS-751	67 LT	198+98	8.1-9.6	A-2-4(0)	11	NP	45.7	35.3	4.9	14.0	100	78	20	-	-
SS-752	67 LT	198+98	13.1-14.6	A-4(4)	28	7	0.4	33.9	39.6	26.1	100	100	79	36.8	-
SS-753	67 LT	198+98	23.6-25.1	A-7-6(20)	43	18	0.8	3.8	53.3	42.1	100	99	97	-	-
SS-754	67 LT	198+98	33.1-34.6	A-1-b(0)	23	NP	66.4	16.4	9.1	8.0	59	30	11	-	-
SS-755	67 LT	198+98	38.1-39.6	A-2-4(0)	21	NP	24.9	57.2	9.9	8.0	84	68	16	25.3	-
SS-756	67 LT	198+98	48.1-49.6	A-6(5)	33	16	25.5	26.9	13.5	34.1	100	82	52	-	-
SS-757	67 LT	198+98	58.1-59.6	A-7-5(10)	52	13	22.5	13.2	40.2	24.1	100	87	68	-	-
SS-758	67 LT	198+98	68.1-69.6	A-7-5(9)	45	12	20.9	11.6	47.4	20.1	100	89	69	-	-
SS-759	67 LT	198+98	78.1-79.6	A-7-5(12)	49	17	19.9	14.6	43.4	22.1	100	90	68	-	-

EB2-B SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-739	67 RT	199+03	0.0-1.5	A-6(2)	25	11	12.9	44.6	14.2	28.3	100	96	49	-	-
SS-740	67 RT	199+03	8.0-9.5	A-7-6(24)	49	23	2.0	13.3	36.2	48.4	100	99	91	31.4	-
SS-741	67 RT	199+03	18.0-19.5	A-6(12)	36	12	0.0	17.3	48.6	34.1	100	100	93	36.5	-
SS-742	67 RT	199+03	28.0-29.5	A-2-4(0)	21	NP	18.9	53.6	19.6	8.0	100	97	35	-	-
SS-743	67 RT	199+03	38.0-39.5	A-1-a(0)	20	NP	63.0	20.3	10.7	6.0	45	26	9	-	-
SS-744	67 RT	199+03	43.0-44.5	A-7-6(31)	60	38	9.4	15.4	10.9	64.2	100	95	78	-	-
SS-745	67 RT	199+03	53.0-54.5	A-7-5(21)	66	24	18.9	8.2	32.8	40.1	100	87	74	-	-
SS-746	67 RT	199+03	63.0-64.5	A-7-5(11)	52	15	24.5	10.2	43.2	22.1	100	83	67	-	-
SS-747	67 RT	199+03	73.0-74.5	A-7-5(14)	55	18	23.1	10.0	36.8	30.1	100	83	69	-	-
SS-748	67 RT	199+03	83.0-84.5	A-7-6(11)	43	17	18.3	15.8	47.8	18.1	100	88	70	-	-

REFERENCE: R-2582A

PROJECT: 34472

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2582A	1	14

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY NORTHAMPTON

PROJECT DESCRIPTION US 158 FROM I-95 /NC 46 IN ROANOKE RAPIDS TO SR 1312 (ST. JOHN CHURCH ROAD)

SITE DESCRIPTION DUAL BRIDGES NO. 126 & 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)

CONTENTS

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DATE MARCH 2018

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DocuSigned by:
Matthew J. Alexander 5/14/2018
0FB0038EEA0543... SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT / DPT / DMT / VST / PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [X] CME-550 (GFO1042)
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] D-50 (TER346)
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [X] TRICONE 2 15/16" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-23 REBAR WITH CAP (N:984822.3549; E:2419966.2377)

ELEVATION: 151.89 FEET

NOTES:

BORINGS B1 AND B2 WERE PERFORMED BY NCDOT GEU AND ARE INCLUDED IN THIS REPORT.

NOTE: ABUTMENT RETAINING WALLS NOT SHOWN, LAYOUT NOT DETERMINED AT THE TIME OF THIS REPORT.

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	3

SITE PLAN

0 50 100
FEET

SITE #1 - BRIDGES NO. 126 & 127
SKEW = 58° 15' 25"

-L- 191+00

-Y7- 18+00

HEDGE ROW

HEDGE ROW

-Y7- (CSX A-LINE)

CSX RAILWAY

-L- 170+00

WOODS

-L- POT Sta. 170+20.99 =
-Y7- POT Sta. 15+11.31

WOODS

-L- 174+00

EB1-A LL

EB2-A LL

TO GASTON
(SR 1604)

-L- (US 158)

B1

-BL- 23

B2

-L- (US 158)

TO JACKSON
(US 301)

15+00 -Y7-

EB1-B RL

EB2-B RL

HEDGE ROW

WOODS

JANE F. WILLIFORD
DB 638 PG 14

CSX RAILWAY

-Y7- (CSX A-LINE)

JOHN L. FITZHUGH, JR
DB 638 PG 22

13+00 -Y7-

NORTHAMPTON
COUNTY
DB 694 PG 99

WOODS

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -L- TAKEN FROM THE PROVIDED PROJECT TIN FILE (r2582a_ls_tin.tin).

HORIZONTAL 0 40 80 FEET

VERTICAL 0 10 20 40 FEET

VE = 2

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	4

CENTERLINE PROFILE ALONG –L– AT SITE #1 – BRIDGES NO. 126 & 127

SS-650 SS-662
SS-651 SS-663
SS-652 SS-664
SS-653 SS-665
SS-659 SS-666
SS-660 SS-667
SS-661

B1
169+40 -L-
CL

SS-654 SS-668
SS-655 SS-669
SS-656 SS-670
SS-657 SS-671
SS-658

B2
171+50 -L-
14' RT

EXISTING GROUND

UNDIVIDED COASTAL PLAIN, RED AND ORANGE, MOIST, STIFF, SANDY CLAY, TRACE TO LITTLE ORGANICS

UNDIVIDED COASTAL PLAIN, BROWN AND ORANGE, MOIST, LOOSE, SAND

ST-20

ST-21

UNDIVIDED COASTAL PLAIN, RED, ORANGE, AND YELLOW, MOIST TO SATURATED, LOOSE TO MEDIUM DENSE, SILTY AND CLAYEY SAND

AND SAND

04/14

04/14

EXISTING GROUND

UNDIVIDED COASTAL PLAIN, RED AND ORANGE, MOIST, STIFF TO VERY STIFF, SANDY CLAY

COASTAL PLAIN, GRAY, WET, STIFF, SILTY SANDY CLAY TO SANDY SILTY CLAY, SHELL FRAGMENTS (YORKTOWN FORMATION)

COASTAL PLAIN, GREEN, SATURATED, MEDIUM DENSE, SAND, SHELL FRAGMENTS (YORKTOWN FORMATION)

COASTAL PLAIN, WHITE AND TAN, WET, VERY STIFF, SANDY CLAY (CAPE FEAR FORMATION)

COASTAL PLAIN, TAN, SATURATED, DENSE, SAND (CAPE FEAR FORMATION)

RESIDUAL, RED, BROWN, AND TAN, SAPROLITIC, WET, VERY STIFF, SILTY SANDY CLAY

BT

BT

(A) UNDIVIDED COASTAL PLAIN, RED AND ORANGE, WET MEDIUM STIFF TO STIFF, SILTY SANDY CLAY

200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

168+00 169+00 170+00 171+00 172+00 173+00 –L–

NOTE: INFERRED STRATIGRAPHY IS DRAWN ALONG THE BENT WITH THE BORINGS PROJECTED ON TO THE EXISTING GROUND SURFACE TAKEN FROM THE PROVIDED PROJECT TIN FILE (r2582a_ls_tin.tin).

NOTE: CROSS SECTION IS ALONG END BENT 1 OF THE DUAL STRUCTURES. THE END BENT SKEW IS 58° 15' 25" FROM -L-.

0 5 10 20 40
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	5

CROSS SECTION ALONG END BENT 1 AT 169+56.49 –L– SITE #1 – BRIDGES NO. 126 & 127

SS-650 SS-662
SS-651 SS-663
SS-652 SS-664
SS-653 SS-665
SS-659 SS-666
SS-660 SS-667
SS-661

SS-1001
EB1-A LL
169+10 -L-
56' LT

B1
169+40 -L-
CL

SS-1002
EB1-B RL
169+79 -L-
57' RT

EXISTING GROUND

UNDIVIDED COASTAL PLAIN, RED, ORANAGE, AND BROWN, DRY TO MOIST, STIFF TO VERY STIFF, SANDY TO SILTY CLAY AND SANDY CLAY, LITTLE ORGANIC MATERIAL

ST-20

12/17 04/14 12/17

UNDIVIDED COASTAL PLAIN, RED, ORANGE, AND YELLOW-BROWN, DRY TO SATURATED, VERY LOOSE TO VERY DENSE, SAND, SILTY SAND, AND CLAYEY SAND

COASTAL PLAIN, GRAY, MOIST TO WET, SOFT TO HARD, (YORKTOWN FORMATION) SILTY TO SILTY SANDY CLAY, LITTLE TO SOME SHELL FRAGMENTS

COASTAL PLAIN, WHITE, YELLOW-BROWN, AND RED, MOIST TO WET, VERY STIFF TO HARD, SILTY (CAPE FEAR FORMATION) SANDY CLAY

RESIDUAL AND SAPROLITE, WHITE, YELLOW-BROWN, AND HARD, SILTY RED, MOIST TO WET, VERY STIFF TO SANDY CLAY

BT BT BT

END BENT 1 AT STA. 169+56.49 –L–

(A) UNDIVIDED COASTAL PLAIN, BROWN AND ORANGE, MOIST, LOOSE, SAND

(B) UNDIVIDED COASTAL PLAIN, RED, ORANGE, AND GRAY, WET, MEDIUM STIFF TO STIFF, SILTY SANDY CLAY

(C) COASTAL PLAIN, GRAY AND GREEN-GRAY, MOIST TO SATURATED, MEDIUM DENSE, SILTY SAND (YORKTOWN FORMATION)

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NOTE: INFERRED STRATIGRAPHY IS DRAWN ALONG THE BENT WITH THE BORINGS PROJECTED ON TO THE EXISTING GROUND SURFACE TAKEN FROM THE PROVIDED PROJECT TIN FILE (r2582a_ls_tin.tin).

NOTE: CROSS SECTION IS ALONG END BENT 2 OF THE DUAL STRUCTURES. THE END BENT SKEW IS 58° 15' 25" FROM -L-.

0 5 10 20 40
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	6

CROSS SECTION ALONG END BENT 2 AT 170+84.49 –L–
SITE #1 – BRIDGES NO. 126 & 127

SS-654 SS-668
SS-655 SS-669
SS-656 SS-670
SS-657 SS-671
SS-658

SS-1005
EB2-A LL
170+62 -L-
61' LT

B2
171+50 -L-
14' RT

SS-1006
EB2-B RL
171+34 -L-
56' RT

ST-21

EXISTING GROUND

UNDIVIDED COASTAL PLAIN, YELLOW, RED, AND ORANGE, MOIST TO SATURATED, LOOSE TO MEDIUM DENSE, SILTY SAND

COASTAL PLAIN, ORANGE AND GRAY, MOIST TO WET, MEDIUM STIFF TO HARD, SANDY TO SILTY CLAY, TRACE (YORKTOWN FORMATION) TO SOME SHELL FRAGMENTS

COASTAL PLAIN, WHITE, RED, AND BROWN, MOIST TO WET, VERY STIFF TO HARD, SILTY TO SANDY CLAY (CAPE FEAR FORMATION)

RESIDUAL AND SAPROLITE, RED, WHITE, AND BROWN, DRY TO MOIST, VERY STIFF TO HARD, SILTY SANDY CLAY

04/14

12/17

BT

CAVED DRY AT 42.0 FT AFTER 24 HR

(D) UNDIVIDED COASTAL PLAIN, RED AND ORANGE, MOIST, STIFF TO HARD, SANDY AND SILTY CLAY AND SANDY CLAY, LITTLE ORGANIC MATERIAL

(E) UNDIVIDED COASTAL PLAIN, GRAY AND ORANGE, WET, VERY STIFF, SANDY CLAY, TRACE GRAVEL

(F) UNDIVIDED COASTAL PLAIN, GRAY, TAN, AND RED-ORANGE, WET, LOOSE, FINE TO COARSE SAND, TRACE GRAVEL

(G) COASTAL PLAIN, GREEN, SATURATED, MEDIUM DENSE, SAND, SHELL FRAGMENTS (YORKTOWN FORMATION)

(H) COASTAL PLAIN, TAN, GRAY, AND PINK, MOIST TO SATURATED, DENSE, FINE TO COARSE SAND, AND FINE TO COARSE SAND, LITTLE CLAY AND TRACE SILT (CAPE FEAR FORMATION)

END BENT 2 AT STA. 170+84.49 –L–

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. EB1-A LL	**STATION** 169+10	**OFFSET** 56 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 148.4 ft	**TOTAL DEPTH** 114.8 ft	**NORTHING** 984,877	**EASTING** 2,420,016	**24 HR.** 35.5
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/14/17	**COMP. DATE** 12/14/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
150											
										148.4	0.0
										GROUND SURFACE	
										UNDIVIDED COASTAL PLAIN	
										RED AND ORANGE, SILTY CLAY	
145	145.1	3.3									
			10	12	13	25		M			
140	140.1	8.3									
			8	10	10	20		D			
135	135.1	13.3								137.4	11.0
			4	4	4	8		M		RED-ORANGE, YELLOW, AND YELLOW-BROWN, SILTY COARSE TO FINE SAND	
130	130.1	18.3									
			5	5	5	10		M			
125	125.1	23.3									
			6	4	5	9		M			
120	120.1	28.3									
			3	3	3	6		M			
115	115.1	33.3									
			3	3	3	6					
110	110.1	38.3						W			
			2	3	3	6					
105	105.1	43.3						Sat.		TRACE GRAVEL FROM 43 TO 51.5 FT	
			3	1	3	4					
100	100.1	48.3						Sat.			
			1	3	2	5				SOME ROUNDED GRAVEL FROM 51.5 TO 57 FT	
95	95.1	53.3						Sat.			
			11	30	31	61					
90	90.1	58.3								91.4	57.0
			1	1	2	3		W		**COASTAL PLAIN** GRAY, SILTY CLAY, TRACE MICA, INTERBEDDED COARSE TO FINE SANDY CLAY LAYERS APPROXIMATELY 0.1 FT THICK (YORKTOWN FORMATION)	
85	85.1	63.3									
			2	2	2	4		M			
80	80.1	68.3									
			3	3	5	8	SS-1001	61%			
75	75.1	73.3									
			3	3	4	7		M			
70	70.1	78.3								LITTLE TO SOME SHELL FRAGMENTS FROM 68 TO 91 FT	

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. EB1-A LL	**STATION** 169+10	**OFFSET** 56 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 148.4 ft	**TOTAL DEPTH** 114.8 ft	**NORTHING** 984,877	**EASTING** 2,420,016	**24 HR.** 35.5
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/14/17	**COMP. DATE** 12/14/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
70						Match Line				
			11	13	16	29		W		**COASTAL PLAIN** GRAY, SILTY CLAY, TRACE MICA, INTERBEDDED COARSE TO FINE SANDY CLAY LAYERS APPROXIMATELY 0.1 FT THICK (YORKTOWN FORMATION) *(continued)*
65	65.1	83.3								
			11	10	19	29		W		
60	60.1	88.3								
			24	25	25	50		W		
55	55.1	93.3								57.4 91.0
			11	14	17	31		M		WHITE, YELLOW-BROWN, AND RED, SILTY SANDY CLAY (CAPE FEAR FORMATION)
50	50.1	98.3								
			8	14	22	36		M		
45	45.1	103.3								46.4 102.0
			37	37	60	97		M		**RESIDUAL** WHITE, YELLOW-BROWN, AND RED, SILTY SANDY CLAY
40	40.1	108.3								
			15	28	45	73		M		
35	35.1	113.3								
			18	23	35	58		M		33.6 114.8
										Boring Terminated at Elevation 33.6 ft IN RESIDUAL SILTY SANDY CLAY

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. B1	**STATION** 169+40	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 151.4 ft	**TOTAL DEPTH** 109.1 ft	**NORTHING** 984,835	**EASTING** 2,419,968	**24 HR.** 37.5
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 03/11/14	**COMP. DATE** 04/03/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
155											
	151.4	0.0	1	3	2	5	SS-650			151.4 GROUND SURFACE	0.0
150										**UNDIVIDED COASTAL PLAIN** BROWN AND ORANGE SAND, MOIST	
	147.4	4.0	5	8	7	15				148.4	3.0
145										**UNDIVIDED COASTAL PLAIN** RED AND ORANGE SANDY CLAY, MOIST	
	143.7	7.7	4	5	7	12	SS-651			145.1	6.3
140										144.4 **UNDIVIDED COASTAL PLAIN** RED AND ORANGE SANDY CLAY, LITTLE ORGANICS, MOIST	7.0
	138.7	12.7	5	4	5	9	SS-652			**UNDIVIDED COASTAL PLAIN** 140.4 RED AND ORANGE SANDY CLAY, MOIST	11.0
135										**UNDIVIDED COASTAL PLAIN** RED AND ORANGE SAND, MOIST TO SATURATED	
	133.7	17.7	5	7	7	14					
130											
	128.7	22.7	3	4	3	7					
125										125.4	26.0
	123.7	27.7	5	4	5	9	SS-653				
120										120.4	31.0
	118.8	32.6	3	4	3	7					
115											
	113.8	37.6	2	2	4	6	SS-659			113.3	38.1
110										**UNDIVIDED COASTAL PLAIN** RED AND ORANGE SILTY SANDY CLAY, WET	
	108.8	42.6	3	5	6	11				110.4	41.0
105										**UNDIVIDED COASTAL PLAIN** YELLOW AND ORANGE SAND, SATURATED	
	103.8	47.6	3	3	3	6	SS-660				
100											
	98.8	52.6	2	7	20	27					
95											
	93.8	57.6	11	15	14	29	SS-661				
90										90.4	61.0
	88.8	62.6	8	6	5	11				**UNDIVIDED COASTAL PLAIN** RED AND ORANGE CLAY, WET	
85										87.8	63.6
	83.8	67.6	2	2	3	5	SS-662			**UNDIVIDED COASTAL PLAIN** YELLOW SAND, SATURATED	
80										85.4	66.0
	78.8	72.6	1	2	3	5				**COASTAL PLAIN** GRAY SILTY SANDY CLAY, WET (YORKTOWN FORMATION)	
75											

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. B1	**STATION** 169+40	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 151.4 ft	**TOTAL DEPTH** 109.1 ft	**NORTHING** 984,835	**EASTING** 2,419,968	**24 HR.** 37.5
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 03/11/14	**COMP. DATE** 04/03/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
75						Match Line				
	73.8	77.6	WOH	2	2	4	SS-663			**COASTAL PLAIN** GRAY SILTY SANDY CLAY, WET (YORKTOWN FORMATION) *(continued)*
70	68.8	82.6	1	4	4	8				
65	63.8	87.6	25	10	13	23	SS-664 SS-665			65.4 86.0 **COASTAL PLAIN** 63.3 GREEN SAND, SATURATED (YORKTOWN FORMATION) 88.1
60	58.8	92.6	11	15	14	29				**COASTAL PLAIN** WHITE AND TAN SILTY SANDY CLAY, WET (CAPE FEAR FORMATION)
55	53.8	97.6	16	15	7	22	SS-666			
50	48.8	102.6	6	8	15	23	SS-667			50.4 101.0 **RESIDUAL** RED, BROWN, AND TAN, SAPROLITIC, SILTY SANDY CLAY, WET (METAVOLCANIC)
45	43.8	107.6	7	10	16	26				42.3 109.1 Boring Terminated at Elevation 42.3 ft in Very Stiff Silty Sandy Clay

Other Samples:
ST-20 (5.5 - 7.0)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. EB1-B RL	**STATION** 169+79	**OFFSET** 57 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 152.7 ft	**TOTAL DEPTH** 114.5 ft	**NORTHING** 984,785	**EASTING** 2,419,920	**24 HR.** 43.0
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/12/17	**COMP. DATE** 12/13/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
155										
	152.7	0.0								GROUND SURFACE
										UNDIVIDED COASTAL PLAIN
										RED AND BROWN, SILTY CLAY, TRACE MICA
150	149.7	3.0	9	11	12	23		D		
145	144.7	8.0	8	11	12	23		D		
	141.7	11.0								RED, RED-BROWN, AND YELLOW-BROWN, SILTY FINE TO COARSE SAND
140	139.7	13.0	6	5	6	11		D		
135	134.7	18.0	4	3	4	7		M		
130	129.7	23.0	5	6	4	10		M		
125	124.7	28.0	3	3	3	6		M		
120	119.7	33.0	4	4	5	9		M		
115	114.7	38.0	4	5	4	9		M		
110	109.7	43.0	5	6	5	11		M		
								W		TRACE GRAVEL FROM 41 TO 46 FT
105	104.7	48.0	5	4	4	8		W		
100	99.7	53.0	3	9	14	23		Sat.		LITTLE ROUNDED GRAVEL FROM 52.5 TO 66 FT
95	94.7	58.0	16	14	15	29		Sat.		
90	89.7	63.0	16	15	19	34		Sat.		
	86.7	66.0								**COASTAL PLAIN** GRAY, SILTY CLAY, TRACE MICA (YORKTOWN FORMATION)
85	84.7	68.0	3	3	3	6		M		
80	79.7	73.0	2	2	3	5		M		
75										

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. EB1-B RL	**STATION** 169+79	**OFFSET** 57 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 152.7 ft	**TOTAL DEPTH** 114.5 ft	**NORTHING** 984,785	**EASTING** 2,419,920	**24 HR.** 43.0
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/12/17	**COMP. DATE** 12/13/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
75						Match Line				
	74.7	78.0	2	2	4	6		M		**COASTAL PLAIN** GRAY, SILTY CLAY, TRACE MICA (YORKTOWN FORMATION) *(continued)* TRACE SHELL FRAGMENTS 78 TO 81 FT SOME SHELL FRAGMENTS 81 TO 91 FT
70	69.7	83.0	3	3	4	7		M		
65	64.7	88.0	14	10	9	19		M		
	61.7	91.0								GRAY AND GREEN-GRAY, SILTY FINE TO COARSE SAND (YORKTOWN FORMATION)
60	59.7	93.0	5	9	10	19		M		
55	54.7	98.0	6	8	12	20	SS-1002	M		
	55.7	97.0								RED, BROWN, AND GREEN-GRAY, SILTY FINE SANDY CLAY (CAPE FEAR FORMATION)
50	49.7	103.0	7	10	18	28		M		
45	44.7	108.0	7	14	24	38		M		
40	39.7	113.0	6	10	17	27		M		
	46.7	106.0								**RESIDUAL** RED, BROWN, AND WHITE, SILTY FINE SANDY CLAY
	38.2	114.5								Boring Terminated at Elevation 38.2 ft IN RESIDUAL SILTY SANDY CLAY

NCDOT BORE DOUBLE R2582A_GEO_BRDG_SITE1_BH.GPJ NC_DOT.GDT 3/12/18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. EB2-A LL	**STATION** 170+62	**OFFSET** 61 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 153.3 ft	**TOTAL DEPTH** 124.3 ft	**NORTHING** 984,729	**EASTING** 2,420,053	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/20/17	**COMP. DATE** 12/21/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
155										153.3 GROUND SURFACE 0.0
										UNDIVIDED COASTAL PLAIN RED-ORANGE, YELLOW, AND YELLOW-BROWN, SILTY FINE SAND
150	150.5	2.8	8	9	8	17		M		
145	145.5	7.8	2	3	5	8		M		
140	140.5	12.8	6	7	6	13		M		
135	135.5	17.8	4	4	4	8	SS-1005	M		
130	130.5	22.8	3	4	4	8		M		
125	125.5	27.8	4	4	5	9		W		
120	120.5	32.8	2	2	2	4		Sat.		
115	115.5	37.8	3	2	4	6		Sat.		
110	110.5	42.8	3	3	3	6		Sat.		
105	105.5	47.8	14	17	13	30		W		SOME ROUNDED GRAVEL FROM 47 TO 52 FT
										101.3 52.0
100	100.5	52.8	7	5	11	16		M		**COASTAL PLAIN** YELLOW, ORANGE, AND TAN, SILTY FINE TO COARSE SANDY CLAY, LITTLE GRAVEL FROM 52 TO 56 FT (YORKTOWN FORMATION)
95	95.5	57.8	5	5	5	10		M		
										91.8 61.5
90	90.5	62.8	2	2	2	4		W		GRAY, SILTY FINE SANDY CLAY, TRACE MICA, LITTLE TO SOME SHELL FRAGMENTS (YORKTOWN FORMATION)
85	85.5	67.8	2	2	3	5		W		
80	80.5	72.8	3	3	4	7		W		
75	75.5	77.8								

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. EB2-A LL	**STATION** 170+62	**OFFSET** 61 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 153.3 ft	**TOTAL DEPTH** 124.3 ft	**NORTHING** 984,729	**EASTING** 2,420,053	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/20/17	**COMP. DATE** 12/21/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
75						Match Line				
70	70.5	82.8	4	4	5	9		M		71.3 82.0 GRAY, WHITE, AND RED, FINE TO COARSE SANDY CLAY (YORKTOWN FORMATION)
65	65.5	87.8	6	11	18	29		M		
60	60.5	92.8	21	19	23	42		W		61.3 92.0 RED, YELLOW-BROWN, AND WHITE, SILTY FINE SANDY CLAY (CAPE FEAR FORMATION)
55	55.5	97.8	5	8	11	19		M		
50	50.5	102.8	7	10	18	28		M		
45	45.5	107.8	7	10	18	28		M		
40	40.5	112.8	6	8	12	20		M		46.3 107.0 **RESIDUAL** RED-BROWN, WHITE, AND GRAY, SILTY FINE SANDY CLAY
35	35.5	117.8	8	12	16	28		D		
30	30.5	122.8	7	9	11	20		D		
			8	12	15	27		D		29.0 124.3 Boring Terminated at Elevation 29.0 ft IN RESIDUAL SILTY SANDY CLAY BOREHOLE CAVED DRY AT 42.0 FT AFTER 24 HR.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. B2	**STATION** 171+50	**OFFSET** 14 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 153.1 ft	**TOTAL DEPTH** 99.1 ft	**NORTHING** 984,627	**EASTING** 2,419,998	**24 HR.** 34.0
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 03/12/14	**COMP. DATE** 04/08/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) — DEPTH (ft)
155										
	153.1	0.0	WOH	2	6	8				153.1 — 0.0 GROUND SURFACE **UNDIVIDED COASTAL PLAIN** RED AND ORANGE SANDY CLAY, MOIST
150	149.1	4.0	5	8	13	21	SS-654			150.1 — 3.0 RED AND ORANGE FINE SANDY SILTY CLAY, MOIST
145	145.2	7.9	5	6	7	13				146.1 — 7.0 145.4 — 7.7 RED AND ORANGE SANDY CLAY, LITTLE ORGANICS, MOIST **UNDIVIDED COASTAL PLAIN** YELLOW, RED AND ORANGE SAND, MOIST TO SATURATED
140	140.2	12.9	3	3	3	6	SS-655			
135	135.2	17.9	3	4	4	8				
130	130.2	22.9	4	5	3	8				
125	125.2	27.9	2	3	3	6	SS-656			
120	120.2	32.9	2	3	4	7				
115	115.2	37.9	3	3	3	6	SS-657			
110	110.2	42.9	3	2	4	6				
105	105.2	47.9	4	3	5	8	SS-658			
100	100.2	52.9	3	7	5	12				
95	97.2	55.9	20	19	8	27				
90	92.2	60.9	12	10	8	18				
85	85.5	67.6	4	13	15	28	SS-668			
80	80.5	72.6	2	2	4	6	SS-669			82.1 — 71.0 **COASTAL PLAIN** GRAY SAND AND SANDY SILTY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)
75	75.5	77.6								

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Gemperline, J. D.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. B2	**STATION** 171+50	**OFFSET** 14 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 153.1 ft	**TOTAL DEPTH** 99.1 ft	**NORTHING** 984,627	**EASTING** 2,419,998	**24 HR.** 34.0
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 03/12/14	**COMP. DATE** 04/08/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
75						Match Line				
	70.5	82.6	3	3	4	7	SS-670			72.1 — 81.0 GRAY SANDY AND SANDY SILTY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)
70			3	3	4	7				67.1 — 86.0 **COASTAL PLAIN** GREEN SAND WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION)
65	65.5	87.6	10	7	15	22				62.1 — 91.0 **COASTAL PLAIN** WHITE SANDY CLAY, WET (CAPE FEAR FORMATION)
60	60.5	92.6	7	11	15	26	SS-671			57.1 — 96.0 **COASTAL PLAIN** TAN SAND, SATURATED (CAPE FEAR FORMATION)
55	55.5	97.6	25	22	17	39				54.0 — 99.1 Boring Terminated at Elevation 54.0 ft in Dense Sand Other Samples: ST-21 (5.5 - 7.6)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. EB2-B RL	**STATION** 171+34	**OFFSET** 56 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 144.0 ft	**TOTAL DEPTH** 124.8 ft	**NORTHING** 984,634	**EASTING** 2,419,954	**24 HR.** 32.0
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/19/17	**COMP. DATE** 12/19/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
145										144.0 / 0.0 GROUND SURFACE
										UNDIVIDED COASTAL PLAIN RED, FINE SANDY CLAY, TRACE MICA
140	140.7	3.3	6	20	20	40		M		
135	135.7	8.3	5	6	7	13		M		
130	130.7	13.3	3	4	3	7		M		132.0 / 12.0 RED-ORANGE AND YELLOW-BROWN, SILTY FINE SAND, TRACE MICA
125	125.7	18.3	3	3	5	8		M		
120	120.7	23.3	3	4	3	7		M		
115	115.7	28.3	3	2	3	5		W		
110	110.7	33.3	4	3	3	6		W		
105	105.7	38.3	4	3	4	7		W		
100	100.7	43.3	2	3	2	5		Sat.		
95	95.7	48.3	4	4	5	9		Sat.		
90	90.7	53.3	4	6	8	14		Sat.		TRACE TO LITTLE GRAVEL FROM 53 TO 61 FT
85	85.7	58.3	10	12	13	25		W		
80	80.7	63.3	9	10	9	19		W		83.0 / 61.0 GRAY AND ORANGE, FINE SANDY CLAY, TRACE GRAVEL
75	75.7	68.3	WOH	4	3	7		W		78.0 / 66.0 GRAY, TAN, AND RED-ORANGE, FINE TO COARSE SAND, TRACE GRAVEL
70	70.7	73.3	7	3	5	8		W		72.0 / 72.0 **COASTAL PLAIN** ORANGE AND GRAY, SILTY FINE SANDY CLAY, TRACE MICA (YORKTOWN FORMATION)
65	65.7	78.3								

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. EB2-B RL	**STATION** 171+34	**OFFSET** 56 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 144.0 ft	**TOTAL DEPTH** 124.8 ft	**NORTHING** 984,634	**EASTING** 2,419,954	**24 HR.** 32.0
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/19/17	**COMP. DATE** 12/19/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
65						Match Line				
60	60.7	83.3	3	3	4	7		W		**COASTAL PLAIN** ORANGE AND GRAY, SILTY FINE SANDY CLAY, TRACE MICA (YORKTOWN FORMATION) *(continued)* TRACE SHELL FRAGMENTS AT 83 FT TO SOME SHELL FRAGMENTS AT 88 FT
55	55.7	88.3	3	5	7	12		W		
50	50.7	93.3	16	20	13	33		W		49.0 / 95.0 WHITE, RED, AND BROWN, SILTY FINE TO COARSE SANDY CLAY (CAPE FEAR FORMATION)
45	45.7	98.3	9	15	21	36		M		
40	40.7	103.3	14	19	20	39	SS-1006	M		43.0 / 101.0 GRAY, WHITE, AND PINK, FINE TO COARSE SAND, LITTLE CLAY (CAPE FEAR FORMATION)
35	35.7	108.3	19	20	34	54		M		35.0 / 109.0 **RESIDUAL** WHITE, YELLOW-BROWN, AND RED, SILTY FINE SANDY CLAY
30	30.7	113.3	10	14	19	33		M		
25	25.7	118.3	9	13	21	34		M		
20	20.7	123.3	9	10	25	35		M		19.2 / 124.8 Boring Terminated at Elevation 19.2 ft IN RESIDUAL SILTY SANDY CLAY

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 34472.1.4 **TIP:** R-2582A **COUNTY:** NORTHAMPTON

DESCRIPTION: DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7)

Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-1001	-L-	169+10	56' LT	68.3 - 69.8	A-7-6 (30)	62	41	4.8	25.4	31.6	38.2	7	93	91	73	60.7	--
SS-1002	-L-	169+79	57' RT	98.0 - 99.5	A-7-5 (14)	52	19	21.3	10.8	33.1	34.8	0	99	85	70	31.9	--
SS-1005	-L-	170+62	61' LT	17.8 - 19.3	A-2-4 (0)	22	NP	56.8	25.9	7.9	9.4	0	99	87	19	--	--
SS-1006	-L-	171+34	56' RT	103.3-104.8	A-2-4 (0)	21	8	56.0	20.5	7.8	15.7	1	95	62	25	--	--

NP - NON-PLASTIC

Stephanie H. Huffman

Terracon Certified Lab Technician Signature

114-01-1203

Certification Number

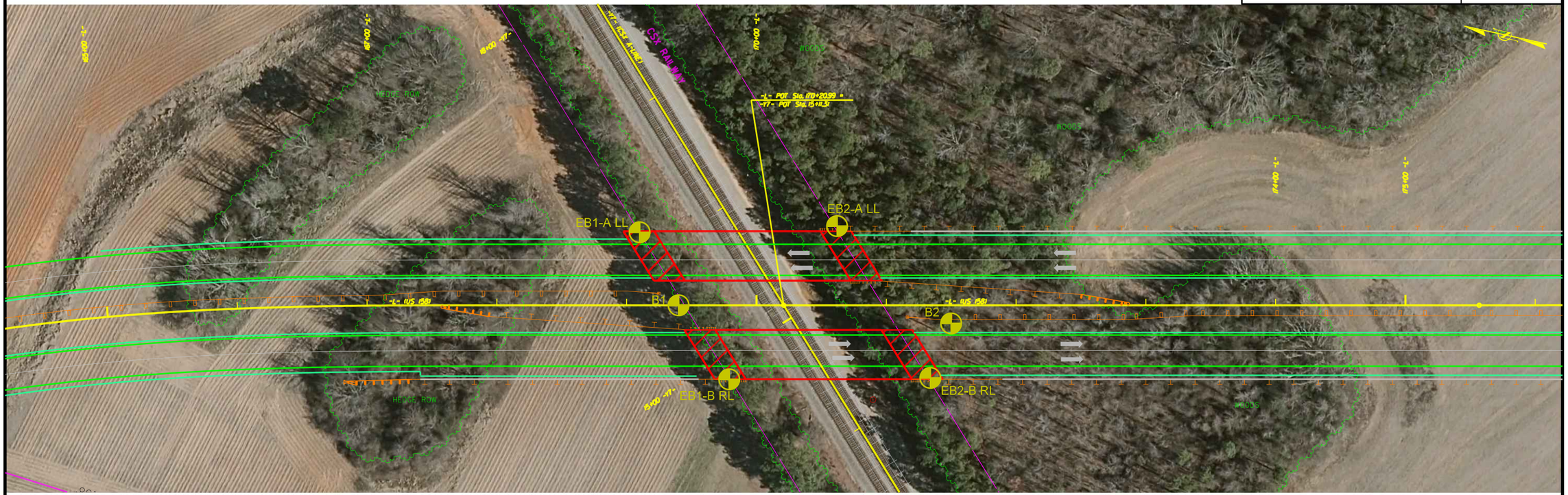
LABORATORY TESTING PERFORMED BY NCDOT AND PROVIDED WITH BORINGS B1 AND B2

Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-650	-L-	169+40	CL	0.0 - 1.5	A-2-4 (0)	18	NP	34.9	35.4	11.5	18.2	--	100	88	35	--	--
SS-651	-L-	169+40	CL	7.7 - 9.2	A-7-6 (16)	52	26	14.7	22.2	8.5	54.5	--	100	97	65	--	--
SS-652	-L-	169+40	CL	12.7 - 14.2	A-2-4 (0)	26	5	64.0	17.2	8.7	10.1	--	100	78	20	--	--
SS-653	-L-	169+40	CL	27.7 - 29.2	A-2-7 (0)	42	15	68.5	11.3	10.1	10.1	--	90	37	20	--	--
SS-659	-L-	169+40	CL	38.1 - 39.1	A-6 (14)	39	26	15.1	22.2	24.5	38.3	--	100	95	65	--	--
SS-660	-L-	169+40	CL	47.6 - 49.1	A-1-b (0)	22	NP	78.5	9.9	5.5	6.0	--	85	31	11	--	--
SS-661	-L-	169+40	CL	57.6 - 59.1	A-1-a (0)	27	NP	72.3	13.5	6.1	8.1	--	47	20	8	--	--
SS-662	-L-	169+40	CL	67.6 - 69.1	A-6 (4)	40	13	14.1	42.3	35.5	10.1	--	90	83	90	--	--
SS-663	-L-	169+40	CL	77.6 - 79.1	A-6 (4)	34	16	29.0	27.6	21.2	22.2	--	95	75	45	--	--
SS-664	-L-	169+40	CL	87.6 - 88.1	A-2-4 (0)	20	NP	20.5	52.8	18.6	8.1	--	100	87	29	--	--
SS-665	-L-	169+40	CL	88.1 - 89.1	A-6 (8)	30	16	9.7	29.8	28.3	32.2	--	100	95	67	--	--
SS-666	-L-	169+40	CL	97.6 - 99.1	A-6 (1)	37	13	48.5	12.3	13.0	26.2	--	88	57	36	--	--
SS-667	-L-	169+40	CL	102.6 - 104.1	A-7-5 (7)	44	12	28.2	12.1	31.5	28.2	--	100	81	61	--	--
SS-654	-L-	171+50	14' RT	4.0 - 5.5	A-7-5 (29)	65	35	8.5	20.2	16.8	54.5	--	100	97	76	--	--
SS-655	-L-	171+50	14' RT	12.9 - 14.4	A-2-4 (0)	29	NP	60.2	21.8	9.9	8.1	--	100	80	20	--	--
SS-656	-L-	171+50	14' RT	27.9 - 29.4	A-2-4 (0)	23	NP	58.6	24.4	12.9	4.0	--	100	83	19	--	--
SS-657	-L-	171+50	14' RT	37.9 - 39.4	A-2-4 (0)	26	NP	60.8	23.4	11.7	4.0	--	100	67	11	--	--
SS-658	-L-	171+50	14' RT	47.9 - 49.4	A-2-4 (0)	14	NP	74.7	14.1	7.1	4.0	--	100	60	13	--	--
SS-668	-L-	171+50	14' RT	67.6 - 69.1	--	--	--	61.6	14.3	9.9	14.1	--	44	22	12	--	--
SS-669	-L-	171+50	14' RT	72.6 - 74.1	A-7-6 (15)	45	19	5.3	30.7	41.8	22.2	--	100	97	76	--	--
SS-670	-L-	171+50	14' RT	82.6 - 84.1	A-6 (1)	30	12	21.3	40.0	10.4	28.3	--	96	86	38	--	--
SS-671	-L-	171+50	14' RT	92.6 - 94.1	A-6 (8)	33	16	13.9	23.8	17.8	44.4	--	100	92	67	--	--
ST-20 1	-L-	169+40	CL	5.5 - 7.0	A-6 (6)	33	17	18.5	30.6	12.7	38.2	--	100	96	55	--	2.9
ST-20 2	-L-	169+40	CL	5.5 - 7.0	A-7-6 (17)	55	26	13.5	22.9	7.2	56.3	--	100	97	66	--	5.0
ST-21	-L-	171+50	14' RT	5.5 - 7.6	A-7-5 (18)	58	25	14.5	21.7	13.6	50.3	--	100	96	68	--	8.0

NP - NON-PLASTIC

SITE #1 – DUAL BRIDGES NO. 126 & 127 SITE PHOTOGRAPHS

PROJECT REFERENCE NO.	SHEET NO.
R–2582A	14



PLAN VIEW WITH AERIAL

LOOKING RIGHT TO LEFT ALONG END BENT 1

FACING UP STATION FROM END BENT 1

REFERENCE: R-2582A

PROJECT: 34472

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2582A	1	7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY NORTHAMPTON

PROJECT DESCRIPTION US 158 FROM I95/NC 46 IN ROANOKE RAPIDS TO SR 1312 (ST. JOHNS CHURCH RD)

SITE DESCRIPTION RETAINING WALL 1 RIGHT OF -L- STA. 26+00

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

L. PUGH

W. J. MILLER, CWC

INVESTIGATED BY L. PUGH

DRAWN BY L. PUGH

CHECKED BY J. L. STONE, PG

SUBMITTED BY J. L. STONE, PG

DATE AUGUST 2018

CATLIN
Engineers and Scientists
Wilmington, North Carolina

NORTH CAROLINA LICENSED SEAL 2007 GEOLOGIST JOSEPH L. STONE

DocuSigned by:

443F443F329A402

SIGNATURE

10/23/2018

DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- _ CME-45C
- _ CME-55
- _ CME-550
- _ VANE SHEAR TEST
- _ PORTABLE HOIST
- X CPT
- X GEOPROBE

ADVANCING TOOLS:
- _ CLAY BITS
- _ 6" CONTINUOUS FLIGHT AUGER
- _ 8" HOLLOW AUGERS
- _ HARD FACED FINGER BITS
- _ TUNG.-CARBIDE INSERTS
- _ CASING _ W/ ADVANCER
- _ TRICONE ____" STEEL TEETH
- _ TRICONE ____" TUNG.-CARB.
- _ CORE BIT
- _ _____

HAMMER TYPE:
- _ AUTOMATIC _ MANUAL

CORE SIZE:
- _ -B ____ _ -H ____
- _ -N ____

HAND TOOLS:
- _ POST HOLE DIGGER
- _ HAND AUGER
- _ SOUNDING ROD
- _ VANE SHEAR TEST
- _ _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: LOCATIONS AND ELEVATIONS OBTAINED WITH REAL TIME KINEMATICS (RTK) SURVEY GRADE GLOBAL POSITIONING SYSTEM (GPS)
ELEVATION: _____ FEET

NOTES:

U.C.P. = UNDIVIDED COASTAL PLAIN

DATE: 8-15-14

CATLIN
Engineers and Scientists
Wilmington, North Carolina

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	3

SITE PLAN

0 30 60
FEET

25+00
26+00
-L-
-L- PC STA. 27+35.91
-I95_RPA- POT STA. 17+17.13
-WALL1- STA. 10+99.31
-WALL1- STA. 11+41.94
PINES
BEGIN -WALL1- STA. 10+00.00=
-L- STA. 25+60.00 (35'RT)
WALL1_01
WALL1_02_DPT
WALL1_03
WALL1_04
WALL1_04_DPT
WALL1_05
PROPOSED RETAINING WALL_1
END -WALL1- STA. 12+05.29=
-I95_RPA- STA. 16+00.00 (86.9' LT)
-I95_RPA-
16+00
15+00

5/14/99

CATLIN
Engineers and Scientists
Wilmington, North Carolina

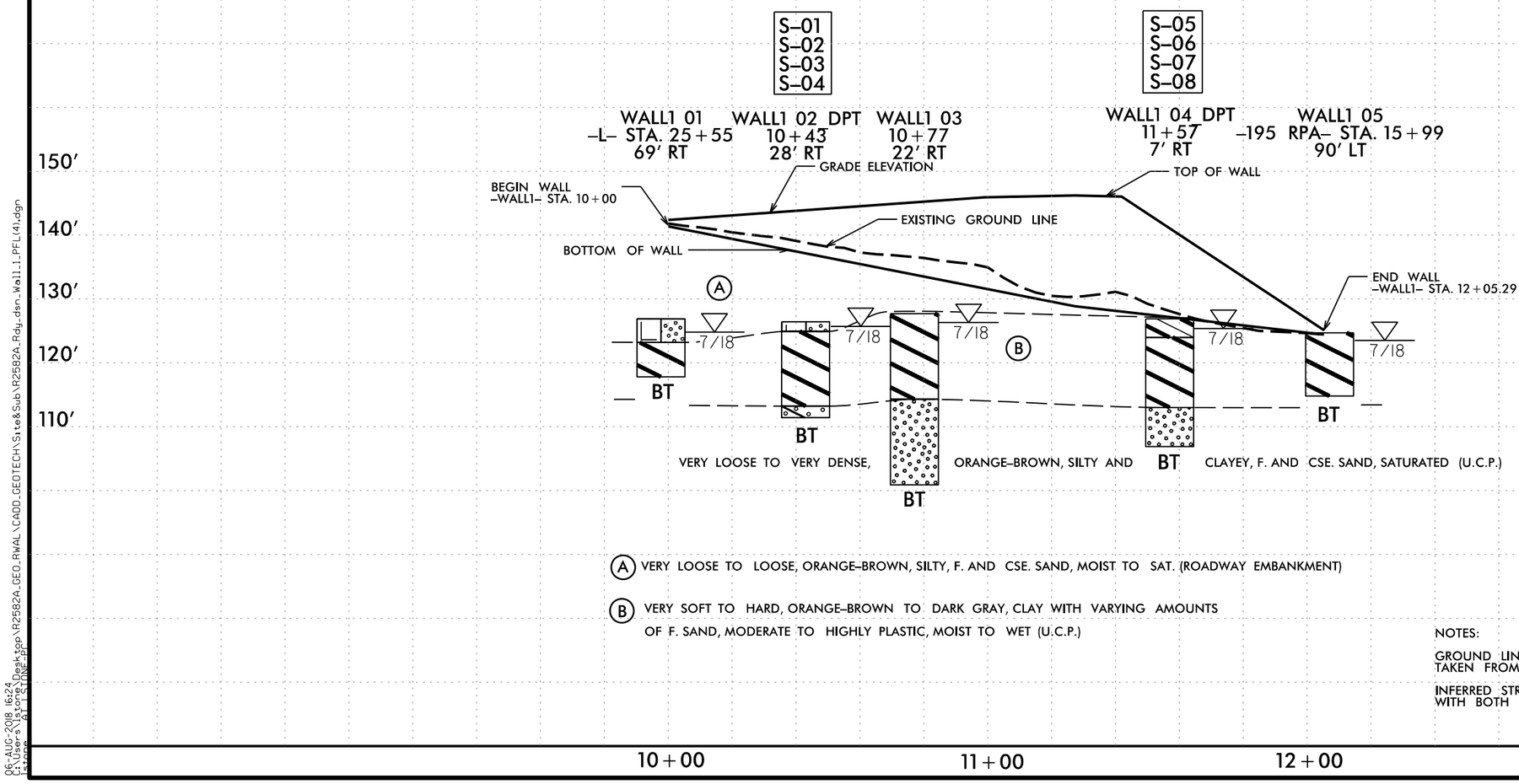
PROJECT REFERENCE NO.	SHEET NO.
R-2582A	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS

SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P. I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-01	28 ft RT	10+43	0.0 - 1.5	A-2-4(0)	21	6	58.9	18.7	10.4	12.0	92	59	25	-	-
S-02	28 ft RT	10+43	1.5 - 8.0	A-7-6(25)	53	31	9.6	16.3	28.5	45.6	82.2	95	77	28	-
S-03	28 ft RT	10+43	8.0 - 13.2	A-7-6(14)	54	32	12.7	35.4	7.4	44.5	99.3	96	55	-	-
S-04	28 ft RT	10+43	13.2 - 15.0	A-2-7(0)	47	14	72.9	11.1	10.2	5.9	81.1	35	18	-	-
S-05	7 ft RT	11+57	0.0 - 2.9	A-6(6)	32	16	21.4	28.3	22.9	27.4	96.1	91	56	17	-
S-06	7 ft RT	11+57	2.9 - 6.9	A-7-6(25)	52	32	10.7	14.1	14.6	60.6	98.5	95	78	-	-
S-07	7 ft RT	11+57	6.9 - 13.9	A-7-6(10)	44	24	20.5	28.8	15.6	35.2	95.1	88	55	-	-
S-08	7 ft RT	11+57	13.9 - 20.0	A-2-4(0)	30	NP	70.0	14.8	10.4	4.9	93.6	53	17	-	-



(A) VERY LOOSE TO LOOSE, ORANGE–BROWN, SILTY, F. AND CSE. SAND, MOIST TO SAT. (ROADWAY EMBANKMENT)

(B) VERY SOFT TO HARD, ORANGE–BROWN TO DARK GRAY, CLAY WITH VARYING AMOUNTS OF F. SAND, MODERATE TO HIGHLY PLASTIC, MOIST TO WET (U.C.P.)

NOTES:

GROUND LINE PROFILE ALONG –WALL1– AND PROPOSED WALL LAYOUT TAKEN FROM WALL ENVELOPE DRAWINGS DATED 6/28/2018

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE

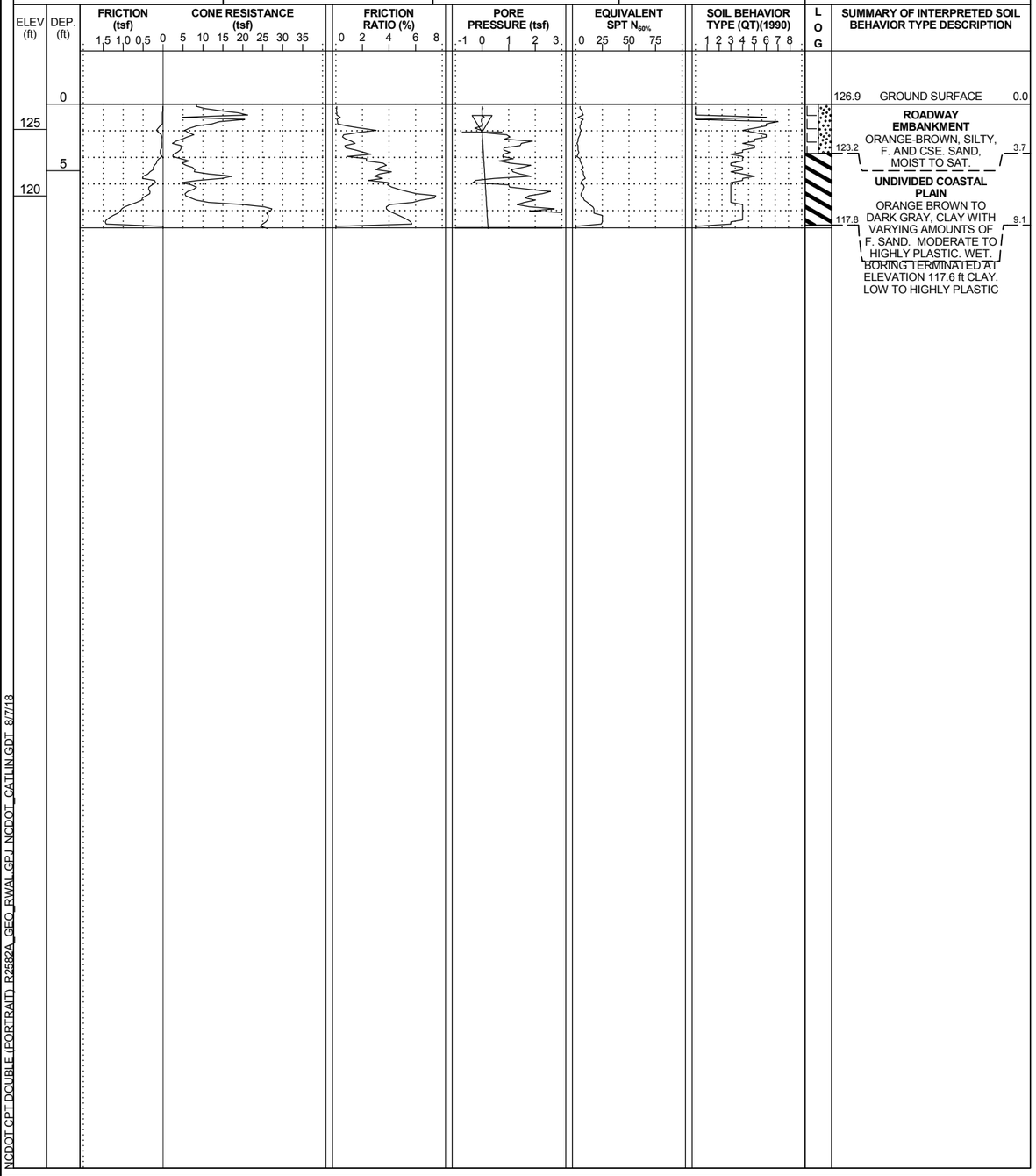
06-AUG-2018 16:24
C:\Users\lstone\Desktop\R2582A_GEO_RWAL\CADD_GEOTECH\Site&Sub\R2582A_Rdy_dsn_Wall1_1_PFL(4).dgn
lstone
ei | STONE-PC

CONE PENETROMETER TEST BORING REPORT

CATLIN Engineers and Scientists
220 Old Dairy Road
Wilmington, NC 28405
Corporate Licensure No. for Engineering Services C-0585
218074

PROJECT REFERENCE NO.	SHEET
R-2582A	1

WBS: 34472.1.4	**TIP:** R-2582A	**COUNTY:** NORTHAMPTON	**GEOLOGIST:** L.PUGH	
SITE DESCRIPTION: RETAINING WALL 1, RIGHT OF -L- STA. 26+00				**GROUND WTR (ft)**
BORING NO.: WALL1_01	**STATION:** 25+55	**OFFSET:** 69 ft RT	**ALIGNMENT:** L	**EST. 0 HR.** 2.1
COLLAR ELEV.: 126.9 ft	**TOTAL DEPTH:** 9.3 ft	**NORTHING:** 992,147	**EASTING:** 2,408,479	**24 HR.** N/A
CPT RIG/MAX. DOWN PRESSURE: / ~10,000 LBS. (NON-ANCHORED)		**CONE TYPE:** TYPE II PIEZO		**CONE ID:** DSG1123
DRILLER: William J. Miller	**OPERATOR:** William J. Miller	**START DATE:** 07/18/18	**COMP. DATE:** 07/18/18	**SURF. WATER DEPTH:** N/A



SUMMARY OF INTERPRETED SOIL BEHAVIOR TYPE DESCRIPTION

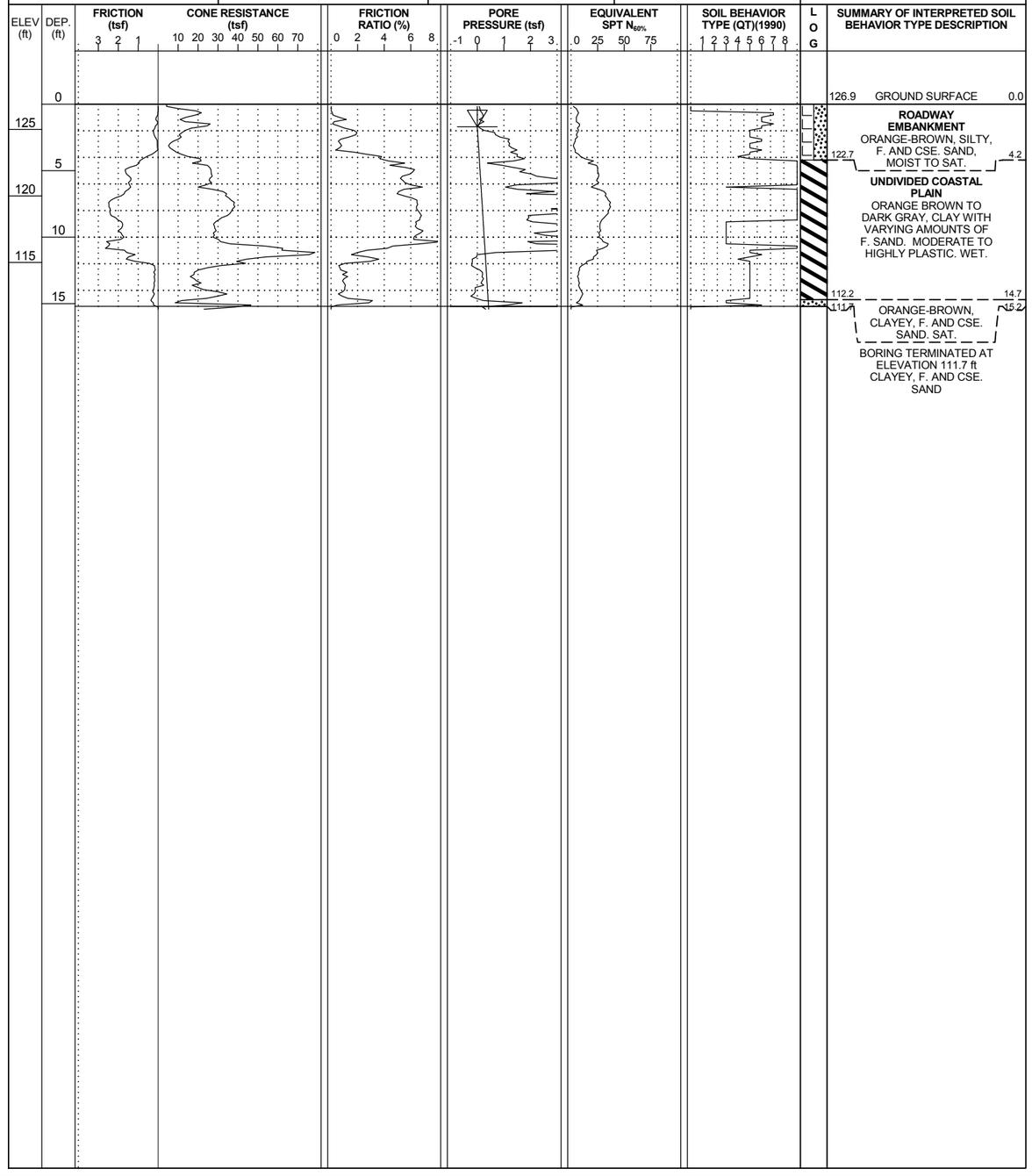
126.9 GROUND SURFACE 0.0

ROADWAY EMBANKMENT
ORANGE-BROWN, SILTY, F. AND CSE. SAND, MOIST TO SAT.
123.2 3.7

UNDIVIDED COASTAL PLAIN
ORANGE BROWN TO DARK GRAY, CLAY WITH VARYING AMOUNTS OF F. SAND. MODERATE TO HIGHLY PLASTIC. WET.
117.8 9.1

BORING TERMINATED AT ELEVATION 117.6 ft CLAY. LOW TO HIGHLY PLASTIC

WBS: 34472.1.4	**TIP:** R-2582A	**COUNTY:** NORTHAMPTON	**GEOLOGIST:** L.PUGH	
SITE DESCRIPTION: RETAINING WALL 1, RIGHT OF -L- STA. 26+00				**GROUND WTR (ft)**
BORING NO.: WALL1_02	**STATION:** 10+33	**OFFSET:** 29 ft RT	**ALIGNMENT:** WALL_1	**EST. 0 HR.** 1.7
COLLAR ELEV.: 126.9 ft	**TOTAL DEPTH:** 15.2 ft	**NORTHING:** 992,119	**EASTING:** 2,408,502	**24 HR.** N/A
CPT RIG/MAX. DOWN PRESSURE: / ~10,000 LBS. (NON-ANCHORED)		**CONE TYPE:** TYPE II PIEZO		**CONE ID:** DSG1123
DRILLER: William J. Miller	**OPERATOR:** William J. Miller	**START DATE:** 07/18/18	**COMP. DATE:** 07/18/18	**SURF. WATER DEPTH:** N/A



SUMMARY OF INTERPRETED SOIL BEHAVIOR TYPE DESCRIPTION

126.9 GROUND SURFACE 0.0

ROADWAY EMBANKMENT
ORANGE-BROWN, SILTY, F. AND CSE. SAND, MOIST TO SAT.
122.7 4.2

UNDIVIDED COASTAL PLAIN
ORANGE BROWN TO DARK GRAY, CLAY WITH VARYING AMOUNTS OF F. SAND. MODERATE TO HIGHLY PLASTIC. WET.
112.2 14.7
111.7 15.2

ORANGE-BROWN, CLAYEY, F. AND CSE. SAND, SAT.

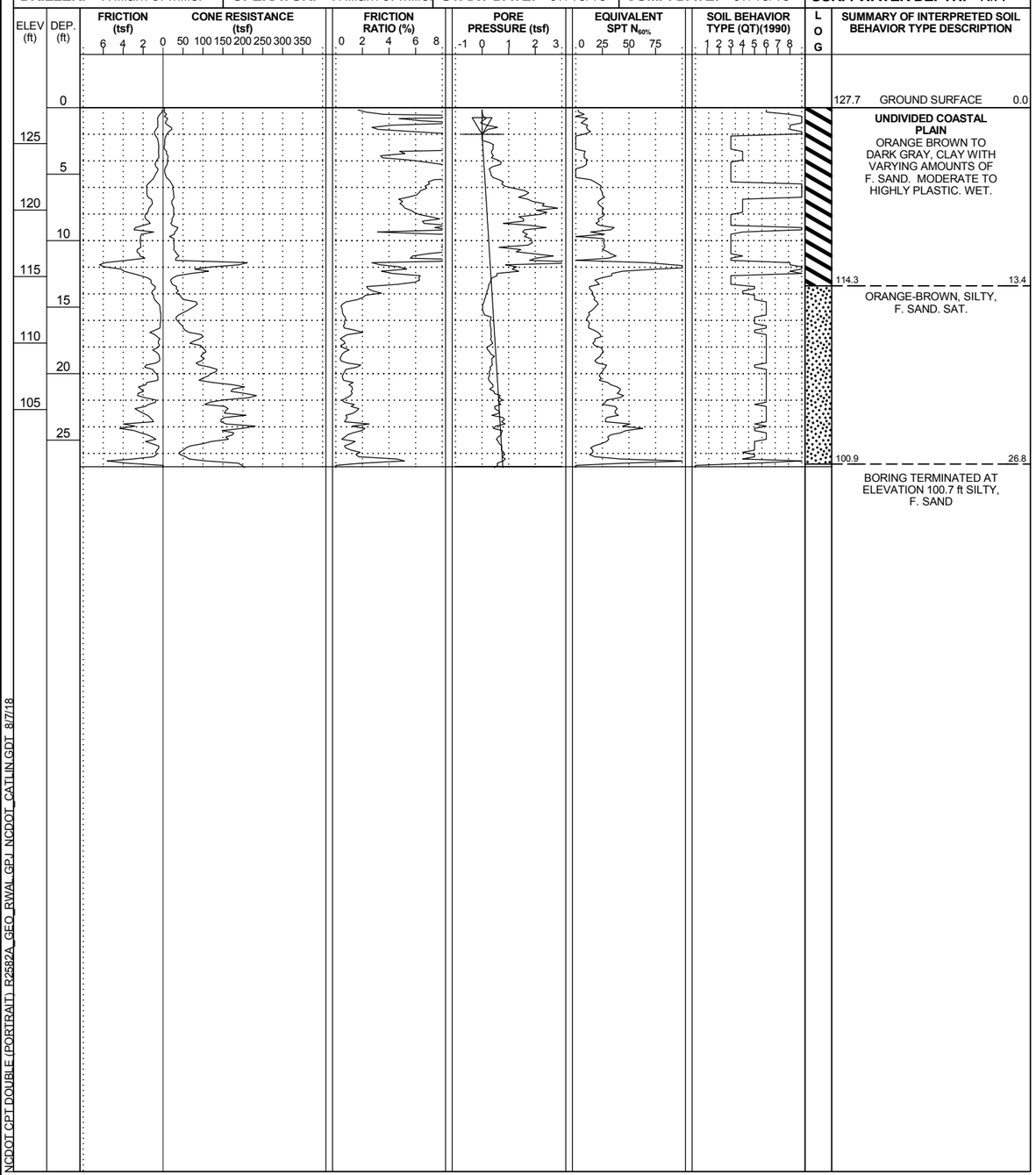
BORING TERMINATED AT ELEVATION 111.7 ft CLAYEY, F. AND CSE. SAND

CONE PENETROMETER TEST BORING REPORT

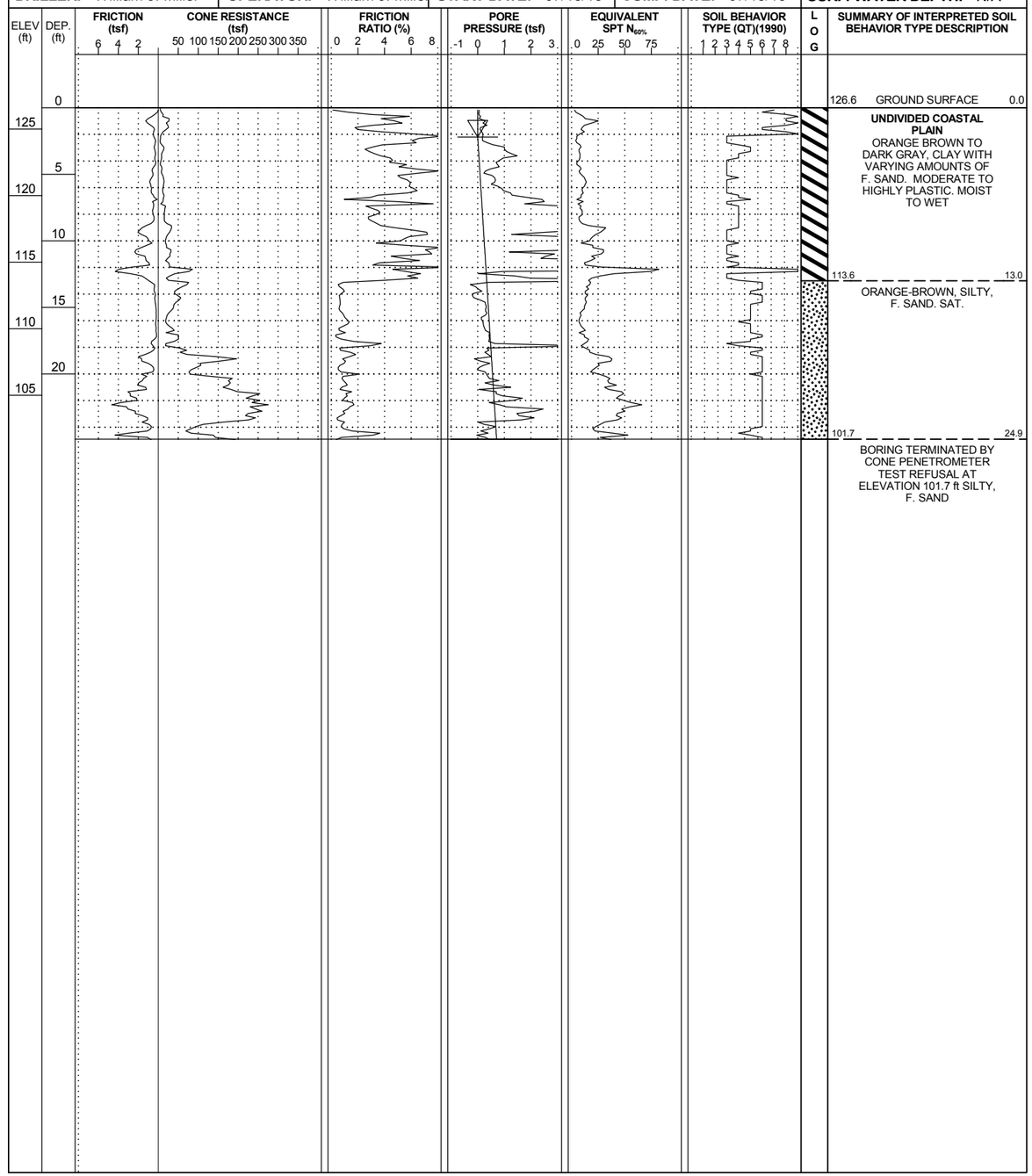
218074 — CATLIN Engineers and Scientists, 220 Old Dairy Road, Wilmington, NC 28405, Corporate Licensure No. for Engineering Services C-0585

PROJECT REFERENCE NO.	SHEET
R-2582A	2

WBS: 34472.1.4	**TIP:** R-2582A	**COUNTY:** NORTHAMPTON	**GEOLOGIST:** L.PUGH	
SITE DESCRIPTION: RETAINING WALL 1, RIGHT OF -L- STA. 26+00				**GROUND WTR (ft)**
BORING NO.: WALL1_03	**STATION:** 10+77	**OFFSET:** 22 ft RT	**ALIGNMENT:** WALL_1	**EST. 0 HR.** 2.0
COLLAR ELEV.: 127.7 ft	**TOTAL DEPTH:** 27.0 ft	**NORTHING:** 992,087	**EASTING:** 2,408,532	**24 HR.** N/A
CPT RIG/MAX. DOWN PRESSURE: / ~10,000 LBS. (NON-ANCHORED)		**CONE TYPE:** TYPE II PIEZO		**CONE ID:** DSG1123
DRILLER: William J. Miller	**OPERATOR:** William J. Miller	**START DATE:** 07/18/18	**COMP. DATE:** 07/18/18	**SURF. WATER DEPTH:** N/A

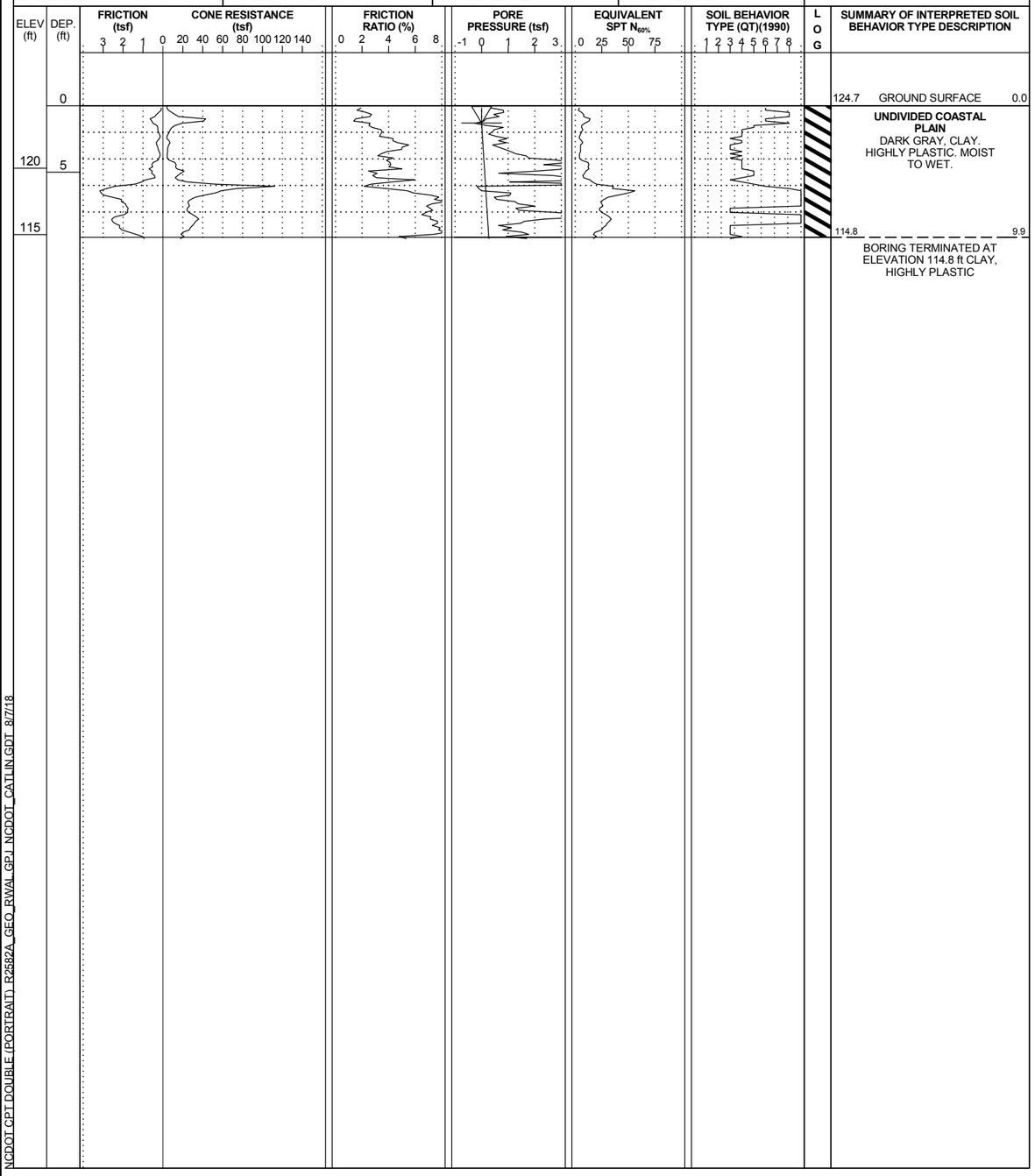


WBS: 34472.1.4	**TIP:** R-2582A	**COUNTY:** NORTHAMPTON	**GEOLOGIST:** L.PUGH	
SITE DESCRIPTION: RETAINING WALL 1, RIGHT OF -L- STA. 26+00				**GROUND WTR (ft)**
BORING NO.: WALL1_04	**STATION:** 11+63	**OFFSET:** 13 ft RT	**ALIGNMENT:** WALL_1	**EST. 0 HR.** 2.2
COLLAR ELEV.: 126.6 ft	**TOTAL DEPTH:** 24.9 ft	**NORTHING:** 992,042	**EASTING:** 2,408,534	**24 HR.** N/A
CPT RIG/MAX. DOWN PRESSURE: / ~10,000 LBS. (NON-ANCHORED)		**CONE TYPE:** TYPE II PIEZO		**CONE ID:** DSG1123
DRILLER: William J. Miller	**OPERATOR:** William J. Miller	**START DATE:** 07/18/18	**COMP. DATE:** 07/18/18	**SURF. WATER DEPTH:** N/A



CONE PENETROMETER TEST
BORING REPORT

WBS: 34472.1.4	**TIP:** R-2582A	**COUNTY:** NORTHAMPTON	**GEOLOGIST:** L.PUGH	
SITE DESCRIPTION: RETAINING WALL 1, RIGHT OF -L- STA. 26+00				**GROUND WTR (ft)**
BORING NO.: WALL1_05	**STATION:** 15+99	**OFFSET:** 89 ft LT	**ALIGNMENT:** -I95_RPA-	**EST. 0 HR.** 1.3
COLLAR ELEV.: 124.7 ft	**TOTAL DEPTH:** 9.9 ft	**NORTHING:** 992,015	**EASTING:** 2,408,497	**24 HR.** N/A
CPT RIG/MAX. DOWN PRESSURE: / ~10,000 LBS. (NON-ANCHORED)		**CONE TYPE:** TYPE II PIEZO		**CONE ID:** DSG1123
DRILLER: William J. Miller	**OPERATOR:** William J. Miller	**START DATE:** 07/18/18	**COMP. DATE:** 07/18/18	**SURF. WATER DEPTH:** N/A



SUMMARY OF INTERPRETED SOIL BEHAVIOR TYPE DESCRIPTION		
124.7	GROUND SURFACE	0.0
	UNDIVIDED COASTAL PLAIN DARK GRAY, CLAY. HIGHLY PLASTIC. MOIST TO WET.	
114.8		9.9
	BORING TERMINATED AT ELEVATION 114.8 ft CLAY, HIGHLY PLASTIC	

NCDOT CPT DOUBLE (PORTRAIT) R2582A_GEO_RWAL.GPJ NCDOT_CATLIN.GDT 8/7/18

CATLIN Engineers and Scientists
220 Old Dairy Road
Wilmington, NC 28405
Corporate Licensure No. for Engineering Services C-0585
218074

PROJECT REFERENCE NO.	SHEET
R-2582A	3

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2582A	1	18

REFERENCE: R-2582A

PROJECT: 34472

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY NORTHAMPTON

PROJECT DESCRIPTION US 158 FROM I-95 / NC 46 IN ROANOKE RAPIDS TO SR 1312 (ST. JOHN CHURCH ROAD)

SITE DESCRIPTION DUAL BRIDGES NO. 650128 AND 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)

CONTENTS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

BUNCH, C. M.
COGAR, T. E.
ARGENBRIGHT, D. N. (NCDOT)
DUGGINS, W. T.
SANTANA, H.
MOSELEY, M. B. (S&ME)
MOSELEY, M. G. (S&ME)

INVESTIGATED BY TERRACON CONSULTANTS
DRAWN BY FIELDS, W. D.
CHECKED BY NASH, A. A.
SUBMITTED BY ALEXANDER, M. J.
DATE JANUARY 2019

Prepared in the Office of:
Terracon
Consulting Engineers and Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367

NORTH CAROLINA PROFESSIONAL SEAL 040231 ENGINEER MATTHEW J. ALEXANDER

DocuSigned by:
Matthew J. Alexander 1/30/2019
0FB0038EEA0A4A2... SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] ACKER (TER92-0)
- [X] D-50 (SME275)

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [X] TRICONE 2 15/16" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: SEE BELOW

ELEVATION: FEET

NOTES:

BORINGS I92+I5 -L- AND I93+55 -L- WERE PERFORMED BY S&ME AND LOGGED BY NCDOT GEU AND ARE INCLUDED IN THIS REPORT.

BENCH MARKS
BL-26; N: 982,897.13, E: 2,420604.63, ELEV. 104.87'
GPS (R258205); N: 982,175.80, E: 2,421,111.80, ELEV. 100.24'

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	3

SITE PLAN

0 50 100
FEET

SITE #2 - BRIDGES NO. 650128 & 650129
SKEW = 85° 36' 16"

190+00

15+00

195+00

WOODS

JANE F. WILLIFORD
DB 638 PG 14

WOODS

EXISTING R/W

-Y8-

EXISTING R/W

ROZELIA C. PITTMAN AND
LAWRENCE C. PITTMAN, JR.
DB 798 PG 490

RUINS

2SFD

-L- POT Sta. 192+85.76 =
-Y8- POT Sta. 12+43.27

GPS (R258205)
N: 982,175.80
E: 2,421,111.80
ELEV. 100.24

-BL- 26
N: 982,897.13
E: 2,420,604.63
ELEV. 104.87

S2-RW1
TYPE B-77

S2-EB1-A (LL)

S2-EB2-A (LL)

S2-RW3
TYPE B-77

TO GASTON
(SR 1604)

BRIDGE #650128

TYPE B-77

-L-

ROZELIA C. PITTMAN
DB 798 PG 493

CONC

DECK

2SFD

192+15 -L-

193+55 -L-

TYPE B-77

TYPE B-77

BRIDGE #650129

TO JACKSON
(US 301)

TYPE B-77
S2-RW2

S2-EB1-B (RL)

S2-EB2-B (RL)

TYPE B-77
S2-RW4

JAMES TINSLEY COLEMAN
DB 576 PG 318

JANE F. WILLIFORD
DB 638 PG 14

WOODS

EXISTING R/W

EXISTING R/W

NOTE: BORINGS 192+15 -L- AND 193+55 -L- WERE PERFORMED PREVIOUSLY
BY NCDOT AND WILL BE INCLUDED IN THE STRUCTURE INVENTORY

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE PROFILE. GROUND LINE TAKEN FROM PROVIDED TIN FILE: r2582a_ls_tin (DATED: 01/25/2018) BORINGS 192+15 -L- AND 193+55 -L- WERE PERFORMED PREVIOUSLY BY NCDOT.

HORIZONTAL 0 40 80 FEET

VERTICAL 0 10 20 40 FEET

VE = 2

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	4

CENTERLINE PROFILE ALONG -L- AT SITE #2 – BRIDGES NO. 650128 & 650129

PROPOSED GRADE

EXISTING GROUND

SS-710	SS-711
SS-712	SS-713
SS-714	SS-715
SS-716	SS-717
SS-718	SS-719
SS-720	ST-27
ST-28	ST-30

SS-700	SS-701
SS-702	SS-703
SS-704	SS-705
SS-706	SS-707
SS-708	SS-709
ST-23	ST-25

S2-RW2
191+61 -L-
73' RT

192+15 -L-
CL

193+55 -L-
CL

S2-RW4
193+93 -L-
70' RT

RAILROAD EMBANKMENT, RED, BROWN, GRAY, LOOSE, MOIST, FINE SILTY SAND (A-2-4)

UNDIVIDED COASTAL PLAIN, GRAY, BROWN, SOFT TO STIFF, MOIST TO WET, COARSE TO FINE SANDY CLAY, SILTY CLAY, TRACE ORGANICS, TRACE GRAVEL (A-7-6, A-6)

SOFT TO VERY STIFF, WET, FINE SANDY CLAY, SHELL FRAGMENTS (A-6) (YORKTOWN FORMATION)

COASTAL PLAIN, GRAY, LOOSE TO DENSE, SATURATED, SILTY FINE TO COARSE SAND, TRACE GRAVEL. (A-2-4, A-1-b)

GRAY, BROWN, VERY STIFF, WET, SILTY CLAY, FINE SANDY CLAY (A-7-6, A-6)

RESIDUAL, TAN, RED, BROWN, GRAY, GREEN, VERY STIFF TO HARD, WET, FINE CLAYEY SANDY SILT, SAPROLITIC (METAVOLCANIC) (A-7-5, A-5, A-4)

(CAPE FEAR FORMATION) SANDY SILTY CLAY, TRACE SHELL FRAGMENTS

Ⓐ UNDIVIDED COASTAL PLAIN, GRAY, LOOSE, SATURATED, SILTY FINE SAND (A-2-4)

190+00 191+00 192+00 193+00 194+00 195+00 -L-

6/23/16

CROSS SECTION THROUGH END BENT 1 AT STA. 191+32 –L–

℄

S2-RW1
191+50 -L-
69' LT

S2-RW2
191+61 -L-
73' RT

UNDIVIDED COASTAL PLAIN, GRAY, LOOSE TO MEDIUM DENSE, WET, SILTY FINE SAND (A-2-4)

EXISTING GROUND

05/18

UNDIVIDED COASTAL PLAIN, GRAY, BROWN, ORANGE, VERY SOFT TO STIFF, WET, SILTY CLAY, INTERBEDDED FINE SAND TO FINE SANDY CLAY LAYERS, FINE SANDY CLAY, INTERBEDDED SILTY FINE SAND LAYERS (A-7-6, A-6)

COASTAL PLAIN, ORANGE, GRAY, VERY SOFT TO MEDIUM STIFF, WET, SILTY CLAY, FINE SANDY CLAY, LITTLE SHELL FRAGMENTS (A-7-6, A-6)

(YORKTOWN FORMATION)

GRAY, LOOSE TO MEDIUM DENSE, WET, CLAYEY COARSE TO FINE SAND, SILTY FINE SAND, TRACE TO LITTLE SHELL FRAGMENTS (A-2-4, A-2-6)

GRAY, STIFF TO VERY STIFF, WET, FINE SANDY CLAY (A-6) (CAPE FEAR FORMATION)

RESIDUAL, RED, TAN, WHITE, BROWN, VERY STIFF, WET, SILTY CLAY (A-7-6)

BT

FIAD
05/18

BT

HORIZONTAL SCALE
0 20 40 FEET

VERTICAL SCALE
0 10 20 FEET

TYPICAL SKEW ANGLE 85° 36' 16"

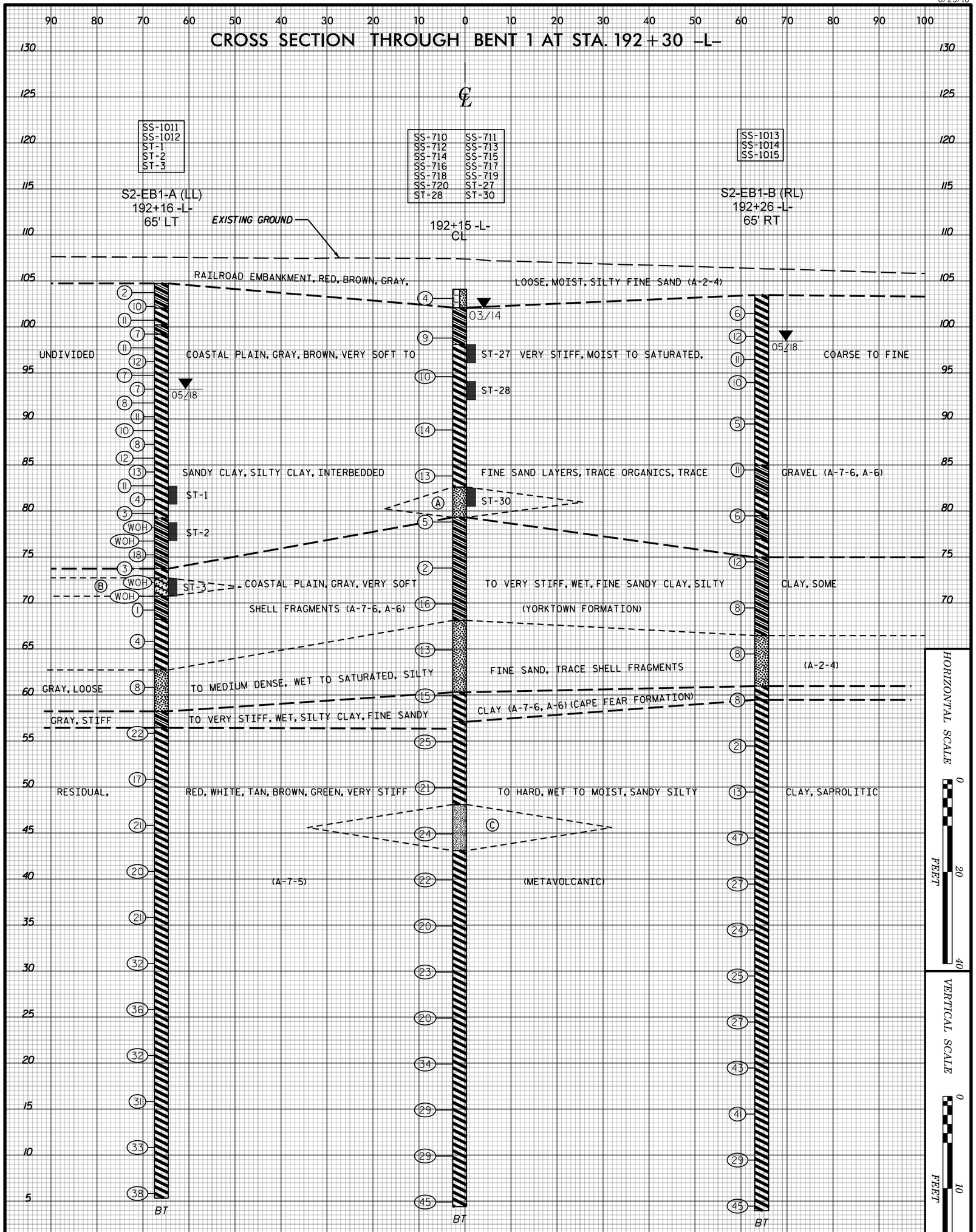
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE: r2582a_ls_tin (DATED: 01/25/2018)

PROJ. REFERENCE NO.
R-2582A

SHEET NO.
5

6/23/16

CROSS SECTION THROUGH BENT 1 AT STA. 192+30 –L–



HORIZONTAL SCALE
0 20 40
FEET

VERTICAL SCALE
0 10 20
FEET

TYPICAL SKEW ANGLE 85° 36' 16"

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE: r2582a_ls_tin (DATED: 01/25/2018)
BORINGS 192+15 -L- AND 193+55 -L- WERE PERFORMED PREVIOUSLY BY NCDOT AND WILL BE INCLUDED IN THE STRUCTURE INVENTORY.

Ⓐ UNDIVIDED COASTAL PLAIN, GRAY, LOOSE, SATURATED, SILTY FINE SAND (A-2-4)

Ⓑ COASTAL PLAIN, GRAY, VERY LOOSE, SATURATED CLAYEY FINE SAND (A-2-6) (YORKTOWN FORMATION)

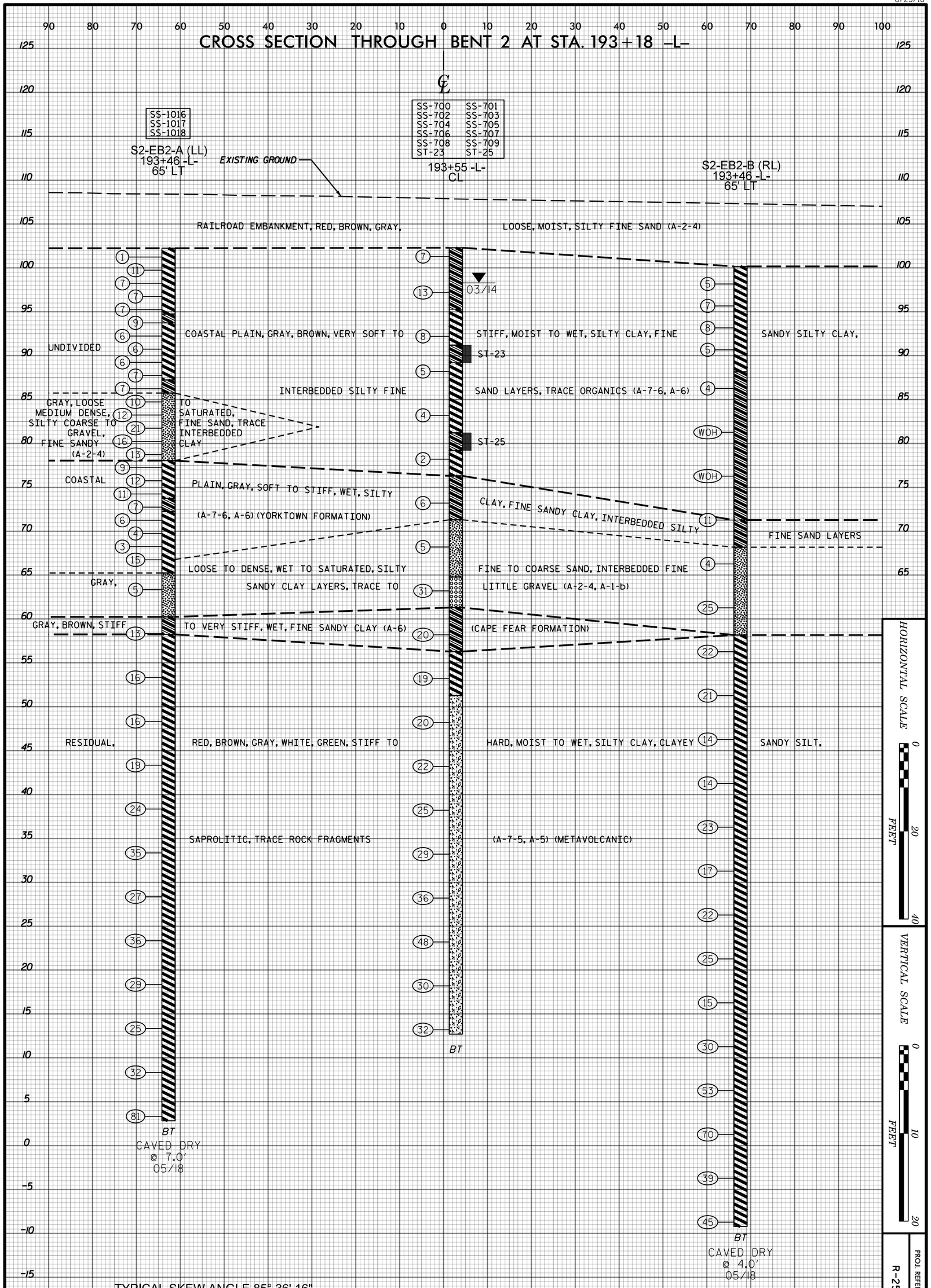
Ⓒ RESIDUAL, TAN, RED, BROWN, VERY STIFF, WET, CLAYEY SANDY SILT (A-4) (METAVOLCANIC)

PROJ. REFERENCE NO. R-2582A

SHEET NO. 6

6/23/16

CROSS SECTION THROUGH BENT 2 AT STA. 193+18 -L-



TYPICAL SKEW ANGLE 85° 36' 16"

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE: r2582a_ls_tin (DATED: 01/25/2018)

BORINGS 192+15 -L- AND 193+55 -L- WERE PERFORMED PREVIOUSLY BY NCDOT AND WILL BE INCLUDED IN THE STRUCTURE INVENTORY.

HORIZONTAL SCALE 0 20 40 FEET

VERTICAL SCALE 0 10 20 FEET

PROJ. REFERENCE NO. R-2582A

SHEET NO. 7

6/23/16

CROSS SECTION THROUGH END BENT 2 AT STA. 193+93 –L–

℄

SS-1008
SS-1009
SS-1010

S2-RW3
193+75 -L-
68' LT

S2-RW4
193+93 -L-
70' RT

EXISTING GROUND

05/18

UNDIVIDED COASTAL PLAIN, GRAY, BROWN, MEDIUM STIFF TO VERY STIFF, WET, SILTY CLAY, LITTLE ORGANICS, FINE SANDY CLAY, INTERBEDDED SILTY FINE SAND LAYERS (A-7-6, A-6)

COASTAL PLAIN,

GRAY, VERY LOOSE TO VERY DENSE, SATURATED, SILTY FINE SAND, TRACE TO SOME GRAVEL (A-2-4) (YORKTOWN FORMATION)

GRAY, STIFF TO VERY STIFF, WET, FINE SANDY CLAY (A-6) (CAPE FEAR FORMATION)

RESIDUAL, RED, BROWN, GRAY, STIFF TO VERY STIFF, WET, SILTY CLAY (A-7-6)

BT

HORIZONTAL SCALE
0 20 40
FEET

VERTICAL SCALE
0 10 20
FEET

TYPICAL SKEW ANGLE 85° 36' 16"

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE: r2582a_ls_tin (DATED: 01/25/2018)

PROJ. REFERENCE NO.	SHEET NO.
R-2582A	8

Terracon
Consulting Engineers and Scientists

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C.M.
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)			**GROUND WTR (ft)**
BORING NO. S2-RW1	**STATION** 191+50	**OFFSET** 69 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 104.1 ft	**TOTAL DEPTH** 64.2 ft	**NORTHING** 982,792	**EASTING** 2,420,745	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/02/18	**COMP. DATE** 05/02/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
105											
										104.1 GROUND SURFACE	0.0
	103.1	1.0	2	1	2	3		W		102.6 **UNDIVIDED COASTAL PLAIN** GRAY, SILTY FINE SAND	1.5
100	100.6	3.5	WOH	2	2	4		W		GRAY, FINE SANDY CLAY	
	98.1	6.0	WOH	2	5	7		W		99.8 GRAY AND BROWN, SILTY CLAY	4.3
95	95.6	8.5	1	2	4	6		W			
	91.4	12.7	WOH	WOH	1	1		W			
90	86.4	17.7	WOH	2	3	5		W		85.7 ORANGE AND GRAY, FINE SANDY CLAY	18.4
85	81.4	22.7	WOH	WOH	2	2		W			
80	76.4	27.7	WOH	WOH	1	1		W		77.6 **COASTAL PLAIN** ORANGE AND GRAY, SILTY CLAY (YORKTOWN FORMATION)	26.5
75	71.4	32.7	WOH	WOH	WOH	0		W		72.6 GRAY, FINE SANDY CLAY, LITTLE SHELL FRAGMENTS	31.5
70	66.4	37.7	4	3	4	7		W			
65	61.4	42.7	5	7	6	13		W		62.1	42.0
60	56.4	47.7	5	7	11	18		W		60.9 GRAY, CLAYEY COARSE TO FINE SAND, LITTLE SHELL FRAGMENTS	43.2
55	51.4	52.7	6	7	12	19		W		58.1 GRAY, FINE SANDY CLAY (CAPE FEAR FORMATION)	46.0
50	46.4	57.7	5	9	12	21		W		**RESIDUAL** RED, TAN AND WHITE, SILTY CLAY	
45	41.4	62.7	6	7	15	22		W		39.9 Boring Terminated at Elevation 39.9 ft IN RESIDUAL SILTY CLAY	64.2
40											

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C.M.
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)			**GROUND WTR (ft)**
BORING NO. S2-RW2	**STATION** 191+61	**OFFSET** 73 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 102.7 ft	**TOTAL DEPTH** 64.4 ft	**NORTHING** 982,716	**EASTING** 2,420,625	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/04/18	**COMP. DATE** 05/04/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
105										
										102.7 GROUND SURFACE 0.0
	101.7	1.0	WOH	WOH	2	2		W		**UNDIVIDED COASTAL PLAIN** GRAY AND BROWN, SILTY CLAY, INTERBEDDED FINE SAND TO FINE SANDY CLAY LAYERS
100	99.2	3.5	2	4	5	9		W		
	96.7	6.0	1	2	4	6		W		
95	94.2	8.5	2	3	5	8		W		
	89.8	12.9	3	3	6	9		W		86.2 16.5
90	84.8	17.9	3	5	8	13		W		GRAY AND BROWN, FINE SANDY CLAY, INTERBEDDED SILTY FINE SAND LAYERS
85	79.8	22.9	3	3	4	7		W		
80	74.8	27.9	1	2	2	4		W		73.7 **COASTAL PLAIN** GRAY AND BROWN, SILTY CLAY (YORKTOWN FORMATION) 29.0
75	69.8	32.9	WOH	WOH	WOH	0		W		69.2 GRAY, FINE SANDY CLAY 33.5
70	64.8	37.9	2	2	4	6		W		65.7 GRAY, SILTY FINE SAND, TRACE SHELL FRAGMENTS 37.0
65	59.8	42.9	2	10	17	27		W		60.7 GRAY, FINE SANDY CLAY (CAPE FEAR FORMATION) 42.0
60	54.8	47.9	5	8	11	19		W		58.7 **RESIDUAL** RED AND BROWN, SILTY CLAY 44.0
55	49.8	52.9	5	7	12	19		W		
50	44.8	57.9	5	9	17	26		W		
45	39.8	62.9	5	7	12	19		W		38.3 Boring Terminated at Elevation 38.3 ft IN RESIDUAL SILTY CLAY 64.4
40										

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C. M.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. S2-EB1-A (LL)	**STATION** 192+16	**OFFSET** 65 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 104.7 ft	**TOTAL DEPTH** 99.4 ft	**NORTHING** 982,731	**EASTING** 2,420,771	**24 HR.** 11.5
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/02/18	**COMP. DATE** 05/03/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
105	104.7	0.0	1	0	2	2 10 11		W		104.7 / 0.0 GROUND SURFACE
	103.2	1.5								**UNDIVIDED COASTAL PLAIN**
	101.7	3.0	5	6	4			M		RED, ORANGE, AND GRAY, COARSE TO FINE SANDY CLAY
100	100.2	4.5	3	4	7			M		102.0 / 2.7 BROWN AND GRAY, SILTY CLAY
	98.7	6.0	2	3	4	7 11 12		W		100.2 / 4.5 GRAY, FINE SANDY CLAY
	97.2	7.5	4	5	6			W		99.2 / 5.5 GRAY AND BROWN, SILTY CLAY, INTERBEDDED FINE SAND LAYERS
95	95.7	9.0	4	5	7			W		
	94.2	10.5	1	3	4	7 8 11				
	92.7	12.0	2	2	5					
	91.2	13.5	2	3	5		SS-1011	33%		
90	89.7	15.0	3	4	7			W		
	88.2	16.5	4	5	5	10 8 12		W		
	86.7	18.0	2	3	5			W		
85	85.2	19.5	6	7	5			W		
	83.7	21.0	2	5	8	13 11 14		W		
	82.2	22.5	2	8	3			W		
	80.7	24.0	1	3	1	3 0 0		W		
80	79.2	25.5	1	1	2			W		79.2 / 25.5 GRAY, FINE SANDY CLAY, TRACE ORGANICS, TRACE GRAVEL
	77.7	27.0	WOR	WOH	WOH			W		
	76.2	28.5	WOH	WOH	WOH			W		
75	74.7	30.0	11	14	4	18 3 0		W		
	73.2	31.5	1	2	1			Sat.		73.7 / 31.0
	71.7	33.0	1	0	WOH			Sat.		72.7 / 32.0 **COASTAL PLAIN** GRAY, SILTY CLAY (YORKTOWN FORMATION)
70	70.2	34.5	WOH	WOH	WOH	0 1		Sat.		70.7 / 34.0 GRAY, CLAYEY FINE SAND
			WOH	WOH	1		SS-1012	37%		
	66.8	37.9								68.2 / 36.5 GRAY, FINE SANDY CLAY
			3	3	1	4		W		GRAY, SILTY CLAY, SOME SHELL FRAGMENTS
65										
	61.8	42.9								62.7 / 42.0 GRAY, SILTY FINE SAND, TRACE SHELL FRAGMENTS
			5	3	5	8		W		
60										
	56.8	47.9								58.2 / 46.5 GRAY, FINE SANDY CLAY (CAPE FEAR FORMATION)
			6	9	13	22		W		56.4 / 48.3 **RESIDUAL** RED, WHITE, AND TAN, SILTY CLAY
55										
	51.8	52.9								
			6	7	10	17		W		
50										
	46.8	57.9								
			3	7	14	21		W		
45										
	41.8	62.9								
			5	7	13	20		W		
40										
	36.8	67.9								
			4	8	13	21		W		
35										
	31.8	72.9								
			5	12	20	32		W		
30										
	26.8	77.9								
			8	14	22	36		W		
25										

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
25						Match Line				
	21.8	82.9	5	10	22	32		W		**RESIDUAL** RED, WHITE, AND TAN, SILTY CLAY *(continued)*
20										
	16.8	87.9	6	11	20	31		M		
15										
	11.8	92.9	6	12	21	33		M		
10										
	6.8	97.9	9	12	26	38		M		5.3 / 99.4 Boring Terminated at Elevation 5.3 ft IN RESIDUAL SILTY CLAY

OTHER SAMPLES:

ST-1 STA. 192+16, 67' LT, (22.0 - 24.0)
ST-2 STA. 192+16, 67' LT, (26.0 - 28.0)
ST-3 STA. 192+16, 67' LT, (32.0 - 34.0)

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Argenbright, D. N.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. 192+15 CL	**STATION** 192+15	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 104.1 ft	**TOTAL DEPTH** 99.7 ft	**NORTHING** 982,701	**EASTING** 2,420,712	**24 HR.** 2.1
DRILL RIG/HAMMER EFF./DATE SME275 DIEDRICH D-50 79% 11/25/2013		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	**START DATE** 03/24/14	**COMP. DATE** 03/24/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
105	104.1	0.0	1	2	2	4				GROUND SURFACE	0.0
										RAILROAD EMBANKMENT	
										RED, BROWN AND GRAY SAND, MOIST	2.0
100	99.8	4.3	4	4	5	9				**UNDIVIDED COASTAL PLAIN**	
							SS-710	18%		GRAY SANDY AND SILTY CLAY, MOIST TO WET	
95	95.6	8.5	3	5	5	10					6.0
90	89.8	14.3	3	6	8	14	SS-711	31%			
85	84.8	19.3	5	6	7	13					
80	79.8	24.3	2	2	3	5	SS-712				
75	74.8	29.3	2	1	1	2					
70	70.9	33.2	3	5	11	16	SS-713				
65	65.9	38.2	6	4	9	13	SS-714				
60	60.9	43.2	6	9	6	15					
55	55.9	48.2	9	11	14	25	SS-715				
50	50.9	53.2	7	9	12	21					
45	45.9	58.2	7	10	14	24	SS-716				
40	40.9	63.2	6	9	13	22					
35	35.9	68.2	7	9	11	20	SS-717				
30	30.9	73.2	9	9	14	23					
25	25.9	78.2	6	8	12						

82.6	21.5	GRAY SAND, SATURATED	
79.3	24.8	**COASTAL PLAIN** GRAY SANDY AND SILTY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)	
68.1	36.0	GRAY SAND WITH SHELL FRAGMENTS, SATURATED	
60.3	43.8	**COASTAL PLAIN** GRAY SILTY CLAY, WET (CAPE FEAR FORMATION)	
57.1	47.0	**RESIDUAL** TAN, RED AND BROWN CLAYEY SANDY SILT AND SANDY SILTY CLAY, WET (METAVOLCANIC)	
48.1	56.0	**SAPROLITE** TAN, RED, BROWN, WET, CLAYEY SANDY SILT	
43.1	61.0	TAN, RED, BROWN AND WHITE SANDY SILTY CLAY, WET	

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Argenbright, D. N.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. 192+15 CL	**STATION** 192+15	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 104.1 ft	**TOTAL DEPTH** 99.7 ft	**NORTHING** 982,701	**EASTING** 2,420,712	**24 HR.** 2.1
DRILL RIG/HAMMER EFF./DATE SME275 DIEDRICH D-50 79% 11/25/2013		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	**START DATE** 03/24/14	**COMP. DATE** 03/24/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
25						Match Line				
20	20.9	83.2	7	13	21	34				
15	15.9	88.2	10	11	18	29	SS-719			
10	10.9	93.2	9	12	17	29				
5	5.9	98.2	13	18	27	45	SS-720			

SS-718	TAN, RED, BROWN AND WHITE SANDY SILTY CLAY, WET *(continued)*
4.4	99.7
	Boring Terminated at Elevation 4.4 ft Very Stiff to Hard Saprolitic Silty Clay

Other Samples:
ST-27 (6.0 - 8.0)
ST-28 (10.0 - 12.0)
ST-30 (21.6 - 23.6)

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BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C. M.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. S2-EB1-B (RL)	**STATION** 192+26	**OFFSET** 65 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 103.3 ft	**TOTAL DEPTH** 99.5 ft	**NORTHING** 982,672	**EASTING** 2,420,655	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/03/18	**COMP. DATE** 05/03/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
105										103.3 / 0.0 GROUND SURFACE
	102.3	1.0	2	2	4	6		M		**UNDIVIDED COASTAL PLAIN** GRAY AND BROWN, SILTY CLAY
100	99.8	3.5	3	5	7	12		W		
	97.3	6.0	4	5	6	11		W		
95	94.8	8.5	3	5	5	10				
	90.3	13.0	1	2	3	5	SS-1013	33%		
90										
85	85.3	18.0	2	5	6	11		W		84.8 / 18.5 GRAY AND BROWN, FINE SANDY CLAY
	80.3	23.0								81.8 / 21.5 GRAY, SILTY CLAY, TRACE ORGANICS
80			1	3	3	6		W		79.3 / 24.0 GRAY, FINE SANDY CLAY
75	75.3	28.0	3	6	6	12	SS-1014	W 30%		76.8 / 26.5 GRAY, SILTY CLAY, TRACE GRAVEL
	70.3	33.0								74.8 / 28.5 **COASTAL PLAIN** GRAY, FINE SANDY CLAY (YORKTOWN FORMATION)
70			5	5	3	8		W		
65	65.3	38.0	4	3	5	8		W		66.3 / 37.0 GRAY, SILTY FINE SAND, TRACE SHELL FRAGMENTS
60	60.3	43.0	2	2	6	8	SS-1015	27% W		60.8 / 42.5 GRAY, FINE SANDY CLAY (CAPE FEAR FORMATION)
55	55.3	48.0	6	9	12	21		W		59.3 / 44.0 **RESIDUAL** RED, BROWN, WHITE, AND GREEN, SILTY CLAY
50	50.3	53.0	3	6	7	13		W		
45	45.3	58.0	14	19	28	47		W		
40	40.3	63.0	6	12	15	27		W		
35	35.3	68.0	6	9	15	24		W		
30	30.3	73.0	5	8	17	25		W		
25	25.3	78.0								

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C. M.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. S2-EB1-B (RL)	**STATION** 192+26	**OFFSET** 65 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 103.3 ft	**TOTAL DEPTH** 99.5 ft	**NORTHING** 982,672	**EASTING** 2,420,655	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/03/18	**COMP. DATE** 05/03/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
25						Match Line				
			6	9	18	27		W		**RESIDUAL** RED, BROWN, WHITE, AND GREEN, SILTY CLAY *(continued)*
20	20.3	83.0	7	19	24	43		W		
15	15.3	88.0	11	17	24	41		M		
10	10.3	93.0	6	9	20	29		M		
5	5.3	98.0	9	19	26	45		M		3.8 / 99.5 Boring Terminated at Elevation 3.8 ft IN RESIDUAL SILTY CLAY

NCDOT BORE DOUBLE R2582A_GEO_BRIDGE.GPJ NC_DOT.GDT 1/28/19

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C. M.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. S2-EB2-A (LL)	**STATION** 193+46	**OFFSET** 65 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 102.2 ft	**TOTAL DEPTH** 99.4 ft	**NORTHING** 982,616	**EASTING** 2,420,832	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/08/18	**COMP. DATE** 05/09/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
105										
	102.2	0.0						W		102.2 GROUND SURFACE 0.0 **UNDIVIDED COASTAL PLAIN** GRAY AND BROWN, SILTY CLAY
100	100.7	1.5	WOH	WOH	1	1		W		
	99.2	3.0	3	5	6	11		W		
	97.7	4.5	2	2	5	7		W		
	96.2	6.0	2	3	4	7		W		
95	94.7	7.5	2	2	5	7	SS-1016	24%		94.7 7.5 93.7 GRAY AND BROWN, FINE SANDY CLAY 8.5 GRAY AND BROWN, SILTY CLAY
	93.2	9.0	2	4	5	9		W		
	91.7	10.5	WOH	2	4	6		W		
90	90.2	12.0	WOH	2	4	6		W		
	88.7	13.5	2	2	4	6	SS-1017	33%		
	87.2	15.0	1	3	4	7		W		87.2 15.0
85	85.7	16.5	3	3	4	7		W		85.7 GRAY, FINE SANDY CLAY, INTERBEDDED SILTY FINE SAND LAYERS 16.5 GRAY, SILTY COARSE TO FINE SAND, TRACE GRAVEL, INTERBEDDED FINE SANDY CLAY
	84.2	18.0	3	4	6	10		Sat.		
	82.7	19.5	4	5	7	12		Sat.		
80	81.2	21.0	7	9	12	21		Sat.		
	79.7	22.5	5	8	8	16		Sat.		
	78.2	24.0	6	5	8	13		Sat.		78.0 24.2 **COASTAL PLAIN** GRAY, SILTY CLAY (YORKTOWN FORMATION)
	76.7	25.5	6	4	5	9		W		
75	75.2	27.0	3	5	7	12		W		
	73.7	28.5	4	5	6	11		W		73.7 28.5 72.2 GRAY, FINE SANDY CLAY 30.0 GRAY, SILTY CLAY, INTERBEDDED SILTY FINE SAND
	72.2	30.0	3	3	4	7	SS-1018	31%		
	70.7	31.5	1	3	3	6		W		
70	69.2	33.0	3	2	2	4		W		
	67.7	34.5	1	1	2	3		W		
	64.3	37.9	3	5	10	15		W		65.2 37.0 GRAY, SILTY FINE SAND, TRACE SHELL FRAGMENTS, INTERBEDDED FINE SANDY CLAY LAYERS
65	59.3	42.9	2	3	2	5		W		60.2 42.0 58.2 GRAY, FINE SANDY CLAY (CAPE FEAR FORMATION) 44.0 **RESIDUAL** RED, BROWN, GRAY, AND WHITE, SILTY CLAY
60	54.3	47.9	3	5	8	13		W		
	49.3	52.9	5	7	9	16		W		
55	44.3	57.9	4	6	10	16		W		
	39.3	62.9	6	7	12	19		W		
50	34.3	67.9	7	9	15	24		M		
	29.3	72.9	9	15	20	35		M		
45	24.3	77.9	9	10	17	27		W		
40										
35										
30										
25										

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
25						Match Line				
	24.3	77.9	9	14	22	36		M		**RESIDUAL** RED, BROWN, GRAY, AND WHITE, SILTY CLAY *(continued)*
20	19.3	82.9	9	12	17	29		M		
15	14.3	87.9	8	12	13	25		M		
10	9.3	92.9	10	13	19	32		M		
5	4.3	97.9	19	29	52	81		M		2.8 99.4 Boring Terminated at Elevation 2.8 ft IN RESIDUAL SILTY CLAY CAVED DRY @ 7.0'

NCDOT BORE DOUBLE R2582A_GEO_BRIDGE.GPJ NC_DOT.GDT 1/28/19

GEOTECHNICAL BORING REPORT
BORE LOG

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WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Argenbright, D. N.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. 193+55 CL	**STATION** 193+55	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 102.3 ft	**TOTAL DEPTH** 89.6 ft	**NORTHING** 982,577	**EASTING** 2,420,778	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE SME275 DIEDRICH D-50 79% 11/25/2013		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	**START DATE** 03/13/14	**COMP. DATE** 03/14/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
105											
	102.3	0.0	1	3	4	7	SS-700			102.3 GROUND SURFACE	0.0
100	98.2	4.1	6	5	8	13				**UNDIVIDED COASTAL PLAIN** GRAY AND BROWN SANDY AND SILTY CLAY, MOIST TO WET	
95	93.2	9.1	3	4	4	8	SS-701	31%		95.3	7.0
90	89.2	13.1	3	3	2	5				91.2	11.1
85	84.2	18.1	2	2	2	4				89.2	13.1
80	79.2	23.1	WOH	1	1	2				81.2	21.1
75	74.2	28.1	2	3	3	6	SS-702	33%		79.2	23.1
70	69.2	33.1	1	2	3	5	SS-703			76.3 **COASTAL PLAIN** GRAY SANDY AND SILTY CLAY (YORKTOWN FORMATION)	26.0
65	64.2	38.1	21	18	13	31	SS-704			71.3 GRAY SAND, SATURATED	31.0
60	59.2	43.1	4	6	14	20	SS-705	24%		64.8	37.5
55	54.2	48.1	5	8	11	19				61.3 **COASTAL PLAIN** GRAY AND BROWN SANDY CLAY, WET (CAPE FEAR FORMATION)	41.0
50	49.2	53.1	5	8	12	20	SS-706			56.3 **RESIDUAL** RED AND BROWN SILTY CLAY, WET (METAVOLCANIC)	46.0
45	44.2	58.1	5	9	13	22				51.3 **SAPROLITE** RED, GRAY, BROWN AND GREEN CLAYEY SANDY SILT, WET	51.0
40	39.2	63.1	6	10	15	25	SS-707				
35	34.2	68.1	6	11	18	29					
30	29.2	73.1	9	14	22	36	SS-708				
25											

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Argenbright, D. N.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. 193+55 CL	**STATION** 193+55	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 102.3 ft	**TOTAL DEPTH** 89.6 ft	**NORTHING** 982,577	**EASTING** 2,420,778	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE SME275 DIEDRICH D-50 79% 11/25/2013		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	**START DATE** 03/13/14	**COMP. DATE** 03/14/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
25						Match Line				
	24.2	78.1	11	18	30	48				**SAPROLITE** RED, GRAY, BROWN AND GREEN CLAYEY SANDY SILT, WET *(continued)*
20	19.2	83.1	7	12	18	30	SS-709			
15	14.2	88.1	9	12	20	32				12.7 Boring Terminated at Elevation 12.7 ft Very Stiff to Hard Saprolitic Clayey Silt 89.6

Other Samples:
ST-23 (11.1 - 13.1)
ST-25 (21.1 - 23.1)

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C. M.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. S2-EB2-B (RL)	**STATION** 193+56	**OFFSET** 65 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 100.2 ft	**TOTAL DEPTH** 109.4 ft	**NORTHING** 982,546	**EASTING** 2,420,722	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/08/18	**COMP. DATE** 05/08/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
105											
100	99.2	1.0								100.2 GROUND SURFACE	0.0
			1	2	3	5		W		**UNDIVIDED COASTAL PLAIN** GRAY AND BROWN, SILTY CLAY	
	96.7	3.5									
95			3	2	5	7		M			
	94.2	6.0									
			4	4	4	8		M			
	91.7	8.5									
90			1	2	3	5		W			
	87.3	12.9								88.2 GRAY, FINE SANDY CLAY, INTERBEDDED SILTY FINE SAND LAYERS, TRACE ORGANICS	12.0
			2	2	2	4		W			
85	82.3	17.9									
			WOH	WOH	WOH	0		W			
80	77.3	22.9									
			WOH	WOH	WOH	0		W			
75	72.3	27.9									
			WOH	1	10	11		W			
70	67.3	32.9								71.3 **COASTAL PLAIN** GRAY, FINE SANDY CLAY, INTERBEDDED SILTY FINE SAND (YORKTOWN FORMATION)	28.9
			2	1	3	4		Sat.		68.2 GRAY, SILTY FINE SAND, TRACE TO LITTLE GRAVEL	32.0
65	62.3	37.9									
			17	19	6	25		Sat.			
60	57.3	42.9								58.2 **RESIDUAL** GRAY, RED, AND BROWN, SILTY CLAY, TRACE ROCK FRAGMENTS	42.0
			5	9	13	22		W			
55	52.3	47.9									
			6	8	13	21		W			
50	47.3	52.9									
			4	6	8	14		W			
45	42.3	57.9									
			4	6	8	14		W			
40	37.3	62.9									
			5	9	14	23		W			
35	32.3	67.9									
			5	6	11	17		W			
30	27.3	72.9									
			5	9	13	22		W			
25											

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C. M.	
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)				**GROUND WTR (ft)**
BORING NO. S2-EB2-B (RL)	**STATION** 193+56	**OFFSET** 65 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 100.2 ft	**TOTAL DEPTH** 109.4 ft	**NORTHING** 982,546	**EASTING** 2,420,722	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/08/18	**COMP. DATE** 05/08/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
25						Match Line				
	22.3	77.9	7	10	15	25		W		**RESIDUAL** GRAY, RED, AND BROWN, SILTY CLAY, TRACE ROCK FRAGMENTS *(continued)*
20	17.3	82.9	4	6	9	15		W		
15	12.3	87.9	9	13	17	30		W		
10	7.3	92.9	14	25	28	53		W		
5	2.3	97.9	15	30	40	70		W		
0	-2.7	102.9	9	11	28	39		W		
-5	-7.7	107.9	9	19	26	45		W		-9.2 Boring Terminated at Elevation -9.2 ft IN RESIDUAL SILTY CLAY 109.4

CAVED DRY @ 4.0'

OTHER SAMPLES:

ST-4 STA. 193+56, 67' RT, (12.0 - 14.0)
ST-5 STA. 193+56, 67' RT, (17.0 - 19.0)

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WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C.M.
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)			**GROUND WTR (ft)**
BORING NO. S2-RW3	**STATION** 193+75	**OFFSET** 68 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 101.7 ft	**TOTAL DEPTH** 64.2 ft	**NORTHING** 982,592	**EASTING** 2,420,847	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/07/18	**COMP. DATE** 05/07/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										101.7 GROUND SURFACE	0.0
								W		**UNDIVIDED COASTAL PLAIN** GRAY AND BROWN, SILTY CLAY	
	100.7	1.0	2	3	3	6		W			
	98.2	3.5	WOH	4	5	9	SS-1008	W			
	95.7	6.0	2	4	5	9		W			
	93.2	8.5	2	2	3	5	SS-1009	W		93.7 GRAY AND BROWN, FINE SANDY CLAY	8.0
	89.0	12.7	5	7	8	15		W		89.7 GRAY AND BROWN, SILTY CLAY	12.0
	84.0	17.7	2	4	6	10		W			
	79.0	22.7	1	0	1	1	SS-1010	W		79.7 GRAY, FINE SANDY CLAY, INTERBEDDED SILTY FINE SAND LAYERS	22.0
	74.0	27.7	2	2	4	6		W			
	69.0	32.7	1	2	1	3		Sat.		69.7 **COASTAL PLAIN** GRAY, SILTY FINE SAND, SOME GRAVEL (YORKTOWN FORMATION)	32.0
	64.0	37.7	13	40	40	80		Sat.			
	59.0	42.7	3	4	6	10		W		59.7 GRAY, FINE SANDY CLAY (CAPE FEAR FORMATION)	42.0
	54.0	47.7	5	7	10	17		W		57.7 **RESIDUAL** RED AND BROWN, SILTY CLAY	44.0
	49.0	52.7	4	9	10	19		W			
	44.0	57.7	6	7	5	12		W			
	39.0	62.7	5	9	14	23		W		37.5 Boring Terminated at Elevation 37.5 ft IN RESIDUAL SILTY CLAY	64.2

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** BUNCH, C.M.
SITE DESCRIPTION DUAL STRUCTURES NO. 650128 & NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)			**GROUND WTR (ft)**
BORING NO. S2-RW4	**STATION** 193+93	**OFFSET** 70 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 100.1 ft	**TOTAL DEPTH** 64.5 ft	**NORTHING** 982,510	**EASTING** 2,420,734	**24 HR.** 14.0
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/24/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER DUGGINS, W	**START DATE** 05/07/18	**COMP. DATE** 05/07/18	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										100.1 GROUND SURFACE 0.0
								W		**UNDIVIDED COASTAL PLAIN** GRAY AND BROWN, SILTY CLAY, LITTLE ORGANICS
	99.1	1.0	2	3	4	7		W		
	96.6	3.5	3	5	6	11		W		
	94.1	6.0	3	3	6	9		W		
	91.6	8.5	4	4	6	10		W		
	87.1	13.0	3	4	4	8		W		
	82.1	18.0	2	4	4	8		W		
	77.1	23.0	WOH	WOH	1	1		W		
	72.1	28.0	7	9	17	26		Sat.		73.1 **COASTAL PLAIN** GRAY, SILTY COARSE TO FINE SAND, TRACE GRAVEL (YORKTOWN FORMATION) 27.0
	67.1	33.0	5	2	2	4		Sat.		
	62.1	38.0	6	10	11	21		W		63.1 GRAY, FINE SANDY CLAY (CAPE FEAR FORMATION) 37.0
	57.1	43.0	11	10	13	23		W		58.1 **RESIDUAL** RED, BROWN, AND GRAY, SILTY CLAY 42.0
	52.1	48.0	7	10	15	25		W		
	47.1	53.0	5	8	13	21		W		
	42.1	58.0	4	7	9	16		W		
	37.1	63.0	5	9	17	26		W		35.6 Boring Terminated at Elevation 35.6 ft IN RESIDUAL SILTY CLAY 64.5

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 34472.1.4 **TIP:** R-2582A **COUNTY:** NORTHAMPTON

DESCRIPTION: DUAL BRIDGES NO. 650128 AND NO. 650129 ON US 158 (-L-) OVER CSX SA-LINE (-Y8-)

	Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
									Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
*	SS-710	-L-	192+15	CL	4.3-5.8	A-6(11)	35	17	3.7	29.6	28.2	38.5	-	100	99	76	17.5	-
*	ST-28	-L-	192+15	CL	10.0-12.0	A-7-6(28)	52	26	1.2	11.4	42.6	44.8	-	100	100	93	29.3	-
*	SS-711	-L-	192+15	CL	14.3-15.8	A-7-6(28)	55	26	0.2	15.4	45.8	38.5	-	100	100	92	30.7	-
*	ST-30(1)	-L-	192+15	CL	21.6-23.6	A-2-4(0)	22	NP	42.8	38.7	9.4	9.0	-	100	90	21	-	-
*	ST-30(2)	-L-	192+15	CL	21.6-23.6	A-2-4(0)	25	NP	30.2	45.7	15.1	9.0	-	100	94	28	-	-
*	SS-712	-L-	192+15	CL	24.8-25.8	A-6(7)	34	13	6.7	34.5	36.5	22.3	-	100	99	68	-	-
*	SS-713	-L-	192+15	CL	33.2-34.7	A-6(2)	32	15	19.3	40.6	17.8	22.3	-	100	95	42	-	-
*	SS-714	-L-	192+15	CL	38.2-39.7	A-2-4(0)	18	NP	13.0	63.1	15.8	8.1	-	97	91	24	-	-
*	SS-715	-L-	192+15	CL	48.2-49.7	A-7-5(11)	46	16	18.5	13.0	23.9	44.6	-	100	91	70	-	-
*	SS-716	-L-	192+15	CL	58.2-59.7	A-4(6)	40	8	21.7	11.8	38.1	28.4	-	100	87	68	-	-
*	ST-27(1)	-L-	192+15	CL	6.0-8.0	A-7-6(23)	46	28	2.2	24.8	26.9	46.1	-	100	99	82	30.6	-
*	ST-27(2)	-L-	192+15	CL	6.0-8.0	A-7-6(34)	57	32	0.8	11.2	25.9	62.1	-	100	100	93	-	-
*	SS-717	-L-	192+15	CL	68.2-69.7	A-7-5(15)	56	17	20.5	8.5	22.3	48.7	-	100	86	73	-	-
*	SS-718	-L-	192+15	CL	78.2-79.7	A-7-5(10)	51	14	26.8	8.5	20.1	44.6	-	99	78	65	-	-
*	SS-719	-L-	192+15	CL	88.2-89.7	A-7-5(8)	49	14	29.8	10.5	27.2	32.5	1	95	74	59	-	-
*	SS-720	-L-	192+15	CL	98.2-99.7	A-7-5(10)	53	19	32.2	12.2	24.1	32.5	-	99	78	58	-	-
	SS-1011	-L-	192+16	65 LT	12.0-13.5	A-7-6 (42)	61	40	0.0	12.1	35.2	52.7	-	100	100	95	33.4	-
#	ST-1	-L-	192+16	67 LT	22.0-24.0	A-7-6(26)	48	25	2.9	4.6	35.2	57.3	1	99	98	93	31.1	-
#	ST-2	-L-	192+16	67 LT	26.0-28.0	A-6(7)	31	16	13.2	30.2	28.8	27.9	-	99	93	63	24.9	-
#	ST-3	-L-	192+16	67 LT	32.0-34.0	A-2-6(2)	36	20	21.2	46.1	16.9	15.8	-	99	91	35	-	-
	SS-1012	-L-	192+16	65 LT	34.5-36.0	A-6 (6)	38	26	17.2	41.1	10.6	31.1	2	98	92	42	36.5	-
	SS-1013	-L-	192+26	65 RT	13.0-14.5	A-7-6 (23)	49	26	0.0	30.0	32.7	37.3	-	100	100	84	33.1	-
	SS-1014	-L-	192+26	65 RT	28.5-29.5	A-6 (8)	40	22	4.5	53.6	22.8	19.1	-	99	97	52	29.8	-
	SS-1015	-L-	192+26	65 RT	43.0-44.0	A-7-6 (15)	41	25	16.4	18.5	20.9	44.2	-	100	91	68	27.4	-
	SS-1017	-L-	193+46	65 LT	12.0-13.5	A-7-6 (42)	62	41	3.6	5.1	38.0	53.3	-	100	97	93	33.0	-
	SS-1018	-L-	193+46	65 LT	28.5-30.0	A-6 (7)	37	18	3.1	53.2	23.9	19.8	-	100	100	55	31.3	-
	SS-1016	-L-	193+46	65 LT	6.0-7.5	A-7-6 (20)	44	26	1.5	27.3	33.1	38.1	-	100	100	80	24.3	-
*	SS-700	-L-	193+55	CL	0.0-1.5	A--6(14)	40	23	14.3	14.1	23.2	48.4	-	98	90	74	-	-
*	ST-23	-L-	193+55	CL	11.1-13.1	A-6(12)	37	17	3.2	3.4	37.3	28.1	-	100	99	75	29.1	-
*	ST-25(1)	-L-	193+55	CL	21.1-23.1	A-6(11)	35	13	0.2	21.1	40.5	38.2	-	100	100	87	40.1	-
*	ST-25(2)	-L-	193+55	CL	21.1-23.1	A-6(12)	37	12	0.0	19.3	46.5	34.2	-	100	100	91	-	-
*	SS-702	-L-	193+55	CL	28.1-29.6	A-6(6)	37	12	3.2	43.5	35.1	18.1	-	98	97	63	33.0	-
*	SS-703	-L-	193+55	CL	33.1-34.6	A-2-4(0)	26	NP	13.3	59.9	18.8	8.1	1	97	96	33	-	-
*	SS-704	-L-	193+55	CL	38.1-39.6	A-1-a(0)	20	NP	65.1	21.6	9.3	4.0	37	40	20	7	-	-
*	SS-705	-L-	193+55	CL	43.1-44.6	A-6(12)	39	23	20.4	19.6	17.7	42.3	-	100	90	63	24.2	-
*	SS-706	-L-	193+55	CL	53.1-54.6	A-5(7)	43	9	18.5	12.5	32.7	36.3	-	100	90	71	-	-
*	SS-707	-L-	193+55	CL	63.1-64.6	A-5(10)	46	10	14.7	9.5	31.5	44.4	-	100	92	79	-	-
*	SS-708	-L-	193+55	CL	73.1-74.6	A-5(8)	45	9	19.0	10.3	32.5	38.3	-	100	89	73	-	-
*	SS-709	-L-	193+55	CL	83.1-84.6	A-5(6)	44	10	28.6	9.1	50.2	12.1	-	94	74	60	-	-
*	SS-701	-L-	193+55	CL	9.1-10.6	A-7-6(17)	42	19	1.4	21.6	34.7	42.3	-	100	100	85	30.8	-
#	ST-4	-L-	193+56	67 RT	12.0-14.0	A-6(9)	36	12	0.3	33.2	41.1	25.4	-	100	100	79	26.1	-
#	ST-5	-L-	193+56	67 RT	17.0-19.0	A-6(10)	34	11	0.4	21.9	48.5	29.2	-	100	100	87	34.4	-
	SS-1010	-L-	193+75	68 LT	22.7-24.2	A-6 (3)	26	14	29.0	28.3	18.4	24.3	2	95	81	46	24.2	--
	SS-1008	-L-	193+75	68 LT	3.5-5.0	A-7-6 (23)	49	31	4.8	26.4	22.2	46.6	0	100	98	76	23.0	--
	SS-1009	-L-	193+75	68 LT	8.5-10.0	A-6 (15)	40	21	1.3	35.8	31.0	31.9	0	100	99	75	26.8	--

NP - NON-PLASTIC

* LAB SAMPLE RESULTS PROVIDED BY NCDOT LAB

\# LAB SAMPLE RESULTS PERFORMED BY GEOTECHNICS

Stephanie H. Huffman

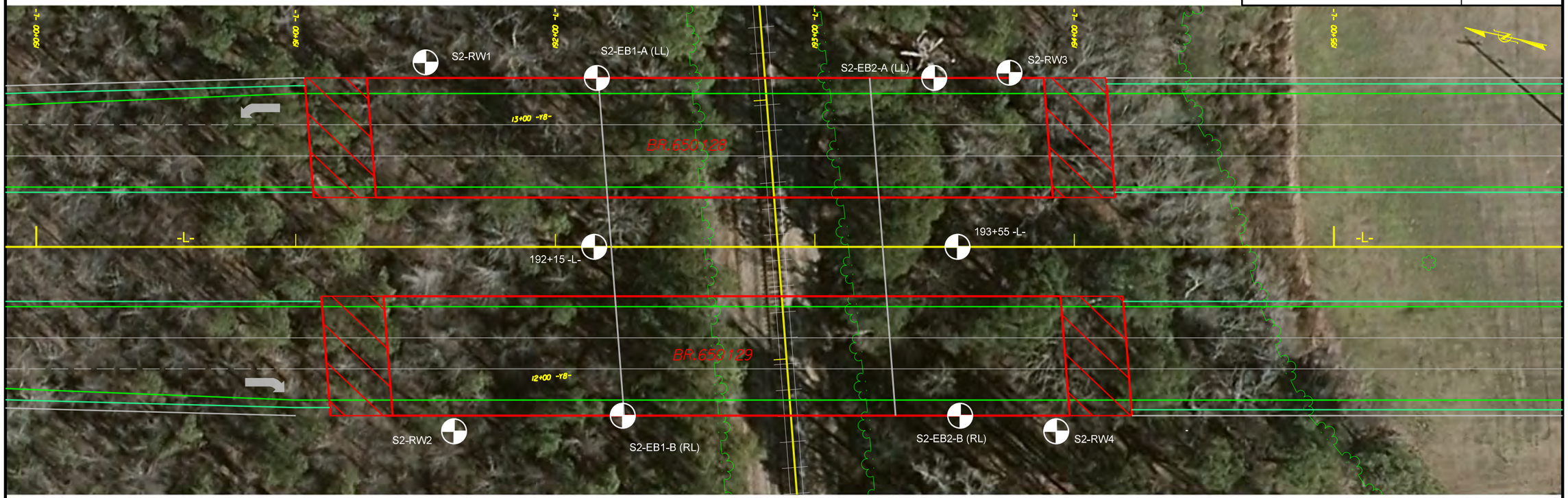
Certified Lab Technician Signature

114-01-1203

Certification Number

SITE #2 – DUAL BRIDGES NO. 650128 & 650129 SITE PHOTOGRAPHS

PROJECT REFERENCE NO.	SHEET NO.
R–2582A	18



PLAN VIEW WITH AERIAL

NORTH APPROACH TO END BENT 1, ALONG -L- ALIGNMENT
NORTH OF CSX RR, LOOKING SOUTHWEST

WEST OF ALIGNMENT, LOOKING EAST
ACROSS BENT 1

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2582A	1	8

REFERENCE: R-2582A

PROJECT: 34472

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY NORTHAMPTON

PROJECT DESCRIPTION US 158 FROM I-95 /NC 46 IN ROANOKE RAPIDS TO SR 1312 (ST. JOHN CHURCH ROAD)

SITE DESCRIPTION MSE RETAINING WALL NO. 1 AND NO. 2 SITE 1 END BENT NO. 1 AND END BENT NO. 2

CONTENTS

CAUTION NOTICE

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5228073BBA7482... SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT / DPT / DMT / VST / PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [X] CME-550 (GFO1042)
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] D-50 (TER346)
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [X] TRICONE 2 5/8" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-23 REBAR WITH CAP (N:984822.3549; E:2419966.2377)

ELEVATION: 151.89 FEET

NOTES:

FIAD - FILLED IMMEDIATELY AFTER DRILLING

BORINGS B1, B2, B-3, B-4, B-5 AND B-6 WERE PERFORMED BY NCDOT AND ARE INCLUDED IN THIS REPORT.

PROJECT REFERENCE NO.	SHEET NO.
R-2582A	3

SITE PLAN

0 50 100
FEET

-L- P0T Sta. 170+20.99 =
-Y7- P0T Sta. 15+11.31

MSE WALL NO. 1

MSE WALL NO. 2

RW-1
168+90 -L-
103' LT

RW-3
170+28 -L-
118' LT

EB1-A (LL)
169+10 -L-
56' LT

EB2-A (LL)
170+62 -L-
61' LT

B-3
168+67 -L-
55' LT

B-5
171+08 -L-
55' LT

B1
169+40 -L-
CL

B2
171+50 -L-
14' RT

B-4
169+44 -L-
55' RT

B-6
171+81 -L-
55' RT

EB1-B (RL)
169+79 -L-
57' RT

EB2-B (RL)
171+34 -L-
56' RT

RW-2
170+15 -L-
117' RT

RW-4
171+50 -L-
83' RT

-BL- 23

-L- (US 158)

-Y7- (CSX A-LINE)

CSX RAILWAY

TO GASTON
(SR 1604)

TO JACKSON
(US 301)

HEDGE ROW

WOODS

JANE F. WILLIFORD
DB 638 PG 14

JOHN L. FITZHUGH, JR
DB 638 PG 22

NORTHAMPTON COUNTY
DB 694 PG 99

NOTE: BORINGS B1, B2, B-3, B-4, B-5 AND B-6 WERE PERFOMED AND PROVIDED BY NCDOT

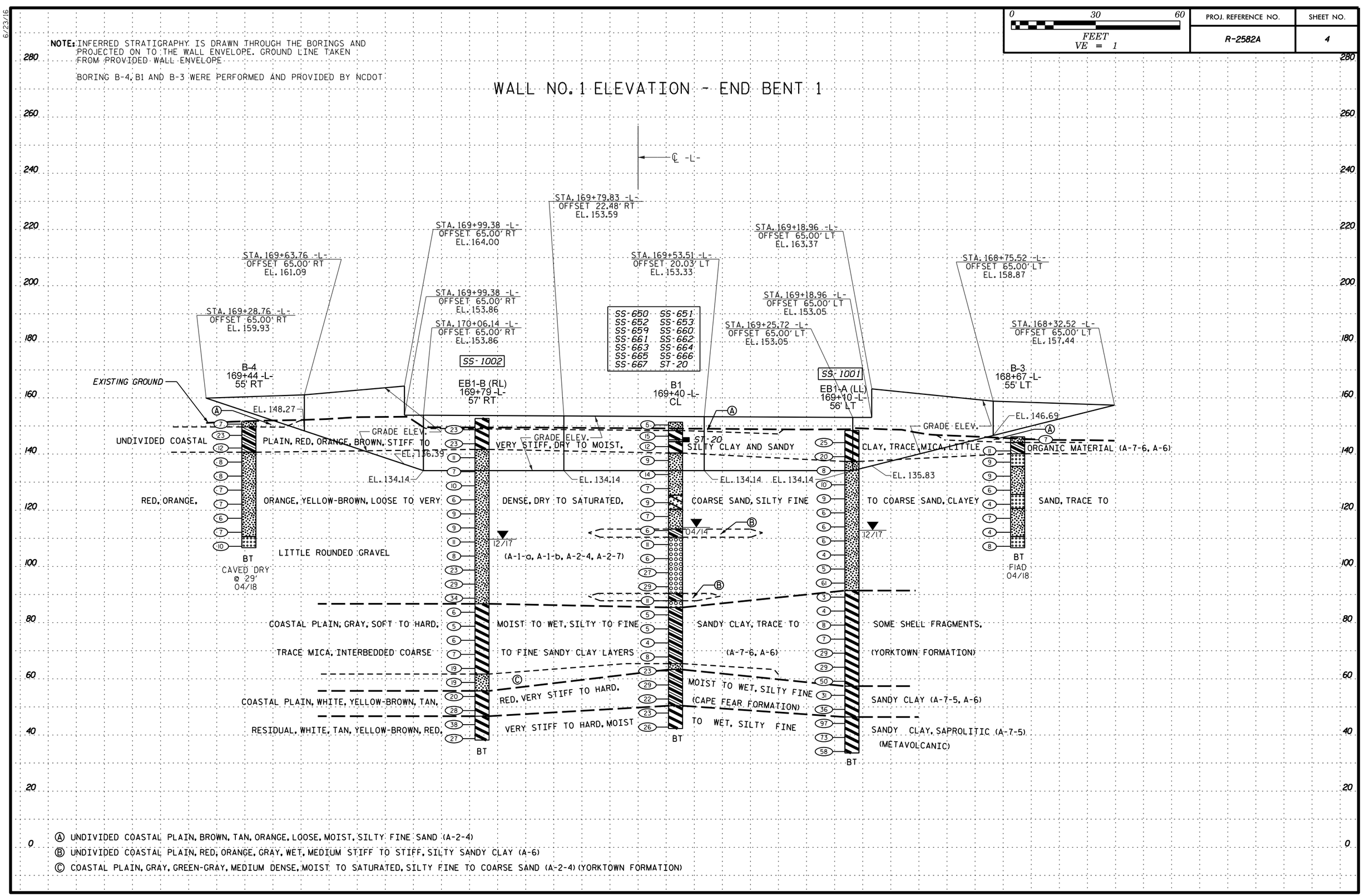
6/23/16

0 30 60 FEET VE = 1	PROJ. REFERENCE NO.	SHEET NO.
	R-2582A	4

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE WALL ENVELOPE. GROUND LINE TAKEN FROM PROVIDED WALL ENVELOPE

BORING B-4, B1 AND B-3 WERE PERFORMED AND PROVIDED BY NCDOT

WALL NO. 1 ELEVATION - END BENT 1



Ⓐ UNDIVIDED COASTAL PLAIN, BROWN, TAN, ORANGE, LOOSE, MOIST, SILTY FINE SAND (A-2-4)

Ⓑ UNDIVIDED COASTAL PLAIN, RED, ORANGE, GRAY, WET, MEDIUM STIFF TO STIFF, SILTY SANDY CLAY (A-6)

Ⓒ COASTAL PLAIN, GRAY, GREEN-GRAY, MEDIUM DENSE, MOIST TO SATURATED, SILTY FINE TO COARSE SAND (A-2-4) (YORKTOWN FORMATION)

6/23/16

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE WALL ENVELOPE. GROUND LINE TAKEN FROM PROVIDED WALL ENVELOPE

BORING B-5, B2 AND B-6 WERE PERFORMED AND PROVIDED BY NCDOT

WALL NO. 2 ELEVATION - END BENT 2

0 30 60
FEET
VE = 1

PROJ. REFERENCE NO.	SHEET NO.
R-2582A	5

280 260 240 220 200 180 160 140 120 100 80 60 40 20 0

STA. 170+88.06 -L-
OFFSET 65.00' LT
EL. 166.46

STA. 171+34.56 -L-
OFFSET 65.00' LT
EL. 168.00

B-5
171+08 -L-
55' LT

EL. 152.50

GRADE ELEV.

EXISTING GROUND

STA. 170+41.60 -L-
OFFSET 65.00' LT
EL. 167.51

STA. 170+41.60 -L-
OFFSET 65.00' LT
EL. 156.99

STA. 170+34.84 -L-
OFFSET 65.00' LT
EL. 156.99

SS-1005
EB2-A LL
170+62 -L-
61' LT

EL. 137.01
EL. 134.76

GRADE ELEV.

STA. 170+61.15 -L-
OFFSET 22.48' LT
EL. 157.26

STA. 170+87.45 -L-
OFFSET 20.04' RT
EL. 157.52

EL. 134.95

GRADE ELEV.

STA. 171+22.03 -L-
OFFSET 65.00' RT
EL. 168.15

STA. 171+22.03 -L-
OFFSET 65.00' RT
EL. 157.80

STA. 171+15.27 -L-
OFFSET 65.00' RT
EL. 157.80

SS-654 SS-655
SS-656 SS-657
SS-658 SS-668
SS-669 SS-670
SS-671 ST-21

B2
171+50 -L-
14' RT

EL. 135.15

EL. 137.60

EL. 135.35

SS-1006
EB2-B RL
171+34 -L-
56' RT

GRADE ELEV.

STA. 171+69.50 -L-
OFFSET 65.00' RT
EL. 167.91

STA. 172+17.50 -L-
OFFSET 65.00' RT
EL. 169.43

B-6
171+81 -L-
55' RT

EL. 153.43

GRADE ELEV.

UNDIVIDED COASTAL PLAIN, YELLOW-BROWN, RED, ORANGE BLACK, TAN, LOOSE TO MEDIUM DENSE, MOIST TO SATURATED, FINE SAND, SILTY FINE SAND

(A-3, A-2-4)

04/14

12/17

BT
CAVED DRY
@ 27.3'
04/18

BT
CAVED DRY
@ 42'
12/17

BT

BT
CAVED DRY
@ 4.1'
04/18

COASTAL PLAIN, ORANGE, GRAY, WHITE, MEDIUM STIFF TO HARD, MOIST TO WET, FINE SANDY TO SILTY

TO SOME SHELL FRAGMENTS, TRACE MICA (A-7-6, A-6) (YORKTOWN FORMATION)

CLAY, TRACE

COASTAL PLAIN, WHITE, RED, YELLOW-BROWN, VERY STIFF TO HARD, MOIST TO WET, SILTY TO

SANDY CLAY (A-7-5, A-6) (CAPE FEAR FORMATION)

FINE TO COARSE

RESIDUAL, RED, BROWN, WHITE, YELLOW-BROWN, GRAY, VERY STIFF TO HARD, DRY TO MOIST, SILTY FINE SANDY CLAY, SAPROLITIC (A-7-5) (METAVOLCANIC)

Ⓓ UNDIVIDED COASTAL PLAIN, RED AND ORANGE-BROWN, MEDIUM STIFF TO HARD, MOIST, SILTY CLAY AND FINE SANDY CLAY, LITTLE ORGANIC MATERIAL (A-7-5, A-6)

Ⓔ UNDIVIDED COASTAL PLAIN, GRAY AND ORANGE, STIFF TO VERY STIFF, WET, FINE SANDY CLAY, TRACE GRAVEL (A-6)

Ⓕ UNDIVIDED COASTAL PLAIN, GRAY, TAN, AND RED-ORANGE, LOOSE, WET, FINE TO COARSE SAND, TRACE GRAVEL (A-1-b)

Ⓒ COASTAL PLAIN, GREEN, MEDIUM DENSE, SATURATED, FINE SAND, TRACE SHELL FRAGMENTS (A-2-4) (YORKTOWN FORMATION)

Ⓗ COASTAL PLAIN, TAN, GRAY, WHITE, PINK, DENSE, MOIST TO SATURATED, FINE SAND, LITTLE CLAY AND TRACE SILT (A-1-b, A-2-4) (CAPE FEAR FORMATION)

Terracon
Consulting Engineers and Scientists

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. RW-1	**STATION** 168+90	**OFFSET** 103 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 145.2 ft	**TOTAL DEPTH** 59.5 ft	**NORTHING** 984,906	**EASTING** 2,420,058	**24 HR.** 34.0
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/13/17	**COMP. DATE** 12/13/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
150										
145										145.2 GROUND SURFACE 0.0
	142.2	3.0	8	11	11	22		D		**UNDIVIDED COASTAL PLAIN** RED, SILTY CLAY
140	137.2	8.0	5	8	9	17		D		
135	132.2	13.0	4	4	4	8	SS-1000	D		135.2 10.0 RED, YELLOW-RED, AND YELLOW-BROWN, SILTY COARSE TO FINE SAND
130	127.2	18.0	3	3	4	7		D		
125	122.2	23.0	4	3	3	6		M		
120	117.2	28.0	3	3	2	5		M		
115	112.2	33.0	3	2	3	5				
110	107.2	38.0	4	3	3	6		Sat.		107.7 37.5 YELLOW-BROWN, COARSE TO FINE SAND, TRACE GRAVEL
105	102.2	43.0	1	1	1	2		W		
100	97.2	48.0	10	8	10	18		Sat.		99.2 46.0 YELLOW-BROWN, SILTY COARSE TO FINE SAND, SOME ROUNDED GRAVEL
95	92.2	53.0	7	4	3	7		Sat.		
90	87.2	58.0	2	3	3	6		M		91.2 54.0 **COASTAL PLAIN** GRAY AND YELLOW-BROWN, SILTY CLAY, INTERBEDDED CLAYEY FINE SAND LAYERS APPROXIMATELY 0.1 FT THICK (YORKTOWN FORMATION) 85.7 59.5 Boring Terminated at Elevation 85.7 ft IN COASTAL PLAIN SILTY CLAY (YORKTOWN FORMATION)

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. RW-2	**STATION** 170+15	**OFFSET** 117 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 153.0 ft	**TOTAL DEPTH** 60.2 ft	**NORTHING** 984,737	**EASTING** 2,419,869	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/12/17	**COMP. DATE** 12/12/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
155										
150										153.0 GROUND SURFACE 0.0
	149.3	3.7	10	12	14	26		D		**UNDIVIDED COASTAL PLAIN** RED-BROWN, YELLOW-BROWN, AND RED, SILTY CLAY, TRACE MICA, INTERBEDDED THIN SAND LAYERS
145	144.3	8.7	8	9	9	18		M		
140	139.3	13.7	4	3	4	7		M		140.5 12.5 RED, ORANGE, AND YELLOW-BROWN, SILTY COARSE TO FINE SAND
135	134.3	18.7	5	6	5	11		M		
130	129.3	23.7	3	4	4	8		W		
125	124.3	28.7	3	3	3	6		W		
120	119.3	33.7	3	4	4	8	SS-1003	W		117.0 36.0 RED-BROWN AND GRAY, SILTY CLAY, TRACE MICA
115	114.3	38.7	4	4	4	8		W		
110	109.3	43.7	3	3	2	5		Sat.		110.5 42.5 YELLOW-BROWN, SILTY FINE TO COARSE SAND
105	104.3	48.7	3	2	5	7		Sat.		
100	99.3	53.7	14	12	13	25		Sat.		LITTLE GRAVEL FROM 53 TO 57 FT
95	94.3	58.7	6	9	20	29		W		96.0 57.0 **COASTAL PLAIN** GRAY AND RED-BROWN, SILTY FINE TO COARSE SANDY CLAY (YORKTOWN FORMATION) 92.8 60.2 Boring Terminated at Elevation 92.8 ft IN COASTAL PLAIN SILTY SANDY CLAY (YORKTOWN FORMATION) BOREHOLE CAVED DRY AT 41 FT AFTER 24 HR.

Terracon
Consulting Engineers and Scientists

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. RW-3	**STATION** 170+28	**OFFSET** 118 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 153.5 ft	**TOTAL DEPTH** 59.7 ft	**NORTHING** 984,775	**EASTING** 2,420,102	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/21/17	**COMP. DATE** 12/21/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
155										153.5 GROUND SURFACE 0.0
										UNDIVIDED COASTAL PLAIN
										YELLOW-ORANGE, RED-ORANGE, AND YELLOW-BROWN, SILTY FINE TO COARSE SAND
150	150.3	3.2	6	6	5	11		M		
145	145.3	8.2	4	2	3	5		M		
140	140.3	13.2	5	4	3	7		M		
135	135.3	18.2	4	3	3	6		M		
130	130.3	23.2	3	2	4	6	SS-1004	M		
125	125.3	28.2	3	3	5	8		M		
120	120.3	33.2	2	3	3	6		W		
115	115.3	38.2	3	3	5	8		Sat.		
110	110.3	43.2	7	4	3	7		Sat.		TRACE GRAVEL FROM 42.5 TO 52 FT
105	105.3	48.2	6	10	10	20		W		
100	100.3	53.2	2	2	3	5		M		101.5 52.0
										COASTAL PLAIN
95	95.3	58.2	1	2	3	5		M		GRAY, SILTY CLAY, TRACE MICA, INTERBEDDED SILTY FINE SANDY CLAY LAYERS (YORKTOWN FORMATION)
										93.8 59.7
										Boring Terminated at Elevation 93.8 ft IN COASTAL PLAIN SILTY CLAY (YORKTOWN FORMATION)
										BOREHOLE CAVED DRY AT 40.2 FT AFTER 24 HR.

WBS 34472.1.4	**TIP** R-2582A	**COUNTY** NORTHAMPTON	**GEOLOGIST** Bunch, C. M.	
SITE DESCRIPTION SITE #1 - DUAL BRIDGES NO. 126 AND 127 ON US 158 (-L-) OVER CSX A-LINE (-Y7-)				**GROUND WTR (ft)**
BORING NO. RW-4	**STATION** 171+50	**OFFSET** 83 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 143.9 ft	**TOTAL DEPTH** 59.8 ft	**NORTHING** 984,613	**EASTING** 2,419,931	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Eklund, M. A.	**START DATE** 12/15/17	**COMP. DATE** 12/15/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
145										143.9 GROUND SURFACE 0.0
										UNDIVIDED COASTAL PLAIN
										RED-ORANGE, SILTY CLAY
140	140.6	3.3	8	11	14	25	SS-1007	23%		
135	135.6	8.3	6	7	7	14		M		132.9 11.0
130	130.6	13.3	4	2	3	5		M		RED-ORANGE, YELLOW-ORANGE, AND YELLOW, SILTY FINE TO COARSE SAND, TRACE MICA
125	125.6	18.3	5	3	5	8		M		
120	120.6	23.3	5	5	3	8		M		INTERBEDDED SILTY FINE SANDY CLAY LAYERS AT 23 FT
115	115.6	28.3	3	3	3	6		M		
110	110.6	33.3	3	3	3	6		M		
105	105.6	38.3	4	3	4	7		W		
100	100.6	43.3	3	3	3	6		Sat.		
95	95.6	48.3	3	3	4	7		Sat.		
90	90.6	53.3	4	3	2	5		Sat.		
85	85.6	58.3	6	13	33	46		W		84.9 59.0
										84.1 YELLOW-ORANGE, SILTY COARSE TO FINE SANDY CLAY 59.8
										SOME ROUNDED GRAVEL FROM 57 TO 59 FT
										Boring Terminated at Elevation 84.1 ft IN UNDIVIDED COASTAL PLAIN SILTY SANDY CLAY
										BOREHOLE CAVED DRY AT 31 FT AFTER 24 HR.

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 34472.1.4 **TIP:** R-2582A **COUNTY:** NORTHAMPTON

DESCRIPTION: MSE RETAINING WALL NO. 1 AND NO. 2 SITE 1 END BENT NO. 1 AND END BENT NO. 2

Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-1000	-L-	168+90	103 LT	13.0 - 14.5	A-2-4 (0)	24	NP	66.4	19.6	4.5	9.5	0	98	62	15	--	--
SS-1001	-L-	169+10	56 LT	68.3 - 69.8	A-7-6 (30)	62	41	4.8	25.4	31.6	38.2	7	93	91	73	60.7	--
SS-1002	-L-	169+79	57 RT	98.0 - 99.5	A-7-5 (14)	52	19	21.3	10.8	33.1	34.8	0	99	85	70	31.9	--
SS-1003	-L-	170+15	117 RT	33.7 - 35.2	A-2-4 (0)	20	NP	65.7	18.5	8.0	7.8	0	100	75	18	--	--
SS-1004	-L-	170+28	118 LT	23.2 - 24.7	A-2-4 (0)	22	NP	67.3	16.6	8.3	7.8	0	99	69	18	--	--
SS-1005	-L-	170+62	61 LT	17.8 - 19.3	A-2-4 (0)	22	NP	56.8	25.9	7.9	9.4	0	99	87	19	--	--
SS-1006	-L-	171+34	56 RT	103.3-104.8	A-2-4 (0)	21	8	56.0	20.5	7.8	15.7	1	95	62	25	--	--
SS-1007	-L-	171+50	83 RT	3.3 - 4.8	A-7-6 (17)	53	27	13.3	24.6	10.3	51.8	0	100	96	67	22.6	--

NP - NON-PLASTIC

Stephanie H. Huffman

Terracon Certified Lab Technician Signature

114-01-1203

Certification Number

LABORATORY TESTING PERFORMED BY NCDOT AND PROVIDED WITH BORINGS B1 AND B2																	
SS-650	-L-	169+40	CL	0.0 - 1.5	A-2-4 (0)	18	NP	34.9	35.4	11.5	18.2	--	100	88	35	--	--
SS-651	-L-	169+40	CL	7.7 - 9.2	A-7-6 (16)	52	26	14.7	22.2	8.5	54.5	--	100	97	65	--	--
SS-652	-L-	169+40	CL	12.7 - 14.2	A-2-4 (0)	26	5	64.0	17.2	8.7	10.1	--	100	78	20	--	--
SS-653	-L-	169+40	CL	27.7 - 29.2	A-2-7 (0)	42	15	68.5	11.3	10.1	10.1	--	90	37	20	--	--
SS-659	-L-	169+40	CL	37.6 - 39.1	A-6 (14)	39	26	15.1	22.2	24.5	38.3	--	100	95	65	--	--
SS-660	-L-	169+40	CL	47.6 - 49.1	A-1-b (0)	22	NP	78.5	9.9	5.5	6.0	--	85	31	11	--	--
SS-661	-L-	169+40	CL	57.6 - 59.1	A-1-a (0)	27	NP	72.3	13.5	6.1	8.1	--	47	20	8	--	--
SS-662	-L-	169+40	CL	67.6 - 69.1	A-6 (4)	40	13	14.1	42.3	35.5	10.1	--	90	83	90	--	--
SS-663	-L-	169+40	CL	77.6 - 79.1	A-6 (4)	34	16	29.0	27.6	21.2	22.2	--	95	75	45	--	--
SS-664	-L-	169+40	CL	87.6 - 88.1	A-2-4 (0)	20	NP	20.5	52.8	18.6	8.1	--	100	87	29	--	--
SS-665	-L-	169+40	CL	88.1 - 89.1	A-6 (8)	30	16	9.7	29.8	28.3	32.2	--	100	95	67	--	--
SS-666	-L-	169+40	CL	97.6 - 99.1	A-6 (1)	37	13	48.5	12.3	13.0	26.2	--	88	57	36	--	--
SS-667	-L-	169+40	CL	102.6 - 104.1	A-7-5 (7)	44	12	28.2	12.1	31.5	28.2	--	100	81	61	--	--
SS-654	-L-	171+50	14 RT	4.0 - 5.5	A-7-5 (29)	65	35	8.5	20.2	16.8	54.5	--	100	97	76	--	--
SS-655	-L-	171+50	14 RT	12.9 - 14.4	A-2-4 (0)	29	NP	60.2	21.8	9.9	8.1	--	100	80	20	--	--
SS-656	-L-	171+50	14 RT	27.9 - 29.4	A-2-4 (0)	23	NP	58.6	24.4	12.9	4.0	--	100	83	19	--	--
SS-657	-L-	171+50	14 RT	37.9 - 39.4	A-2-4 (0)	26	NP	60.8	23.4	11.7	4.0	--	100	67	11	--	--
SS-658	-L-	171+50	14 RT	47.9 - 49.4	A-2-4 (0)	14	NP	74.7	14.1	7.1	4.0	--	100	60	13	--	--
SS-668	-L-	171+50	14 RT	67.6 - 69.1	--	--	--	61.6	14.3	9.9	14.1	--	44	22	12	--	--
SS-669	-L-	171+50	14 RT	72.6 - 74.1	A-7-6 (15)	45	19	5.3	30.7	41.8	22.2	--	100	97	76	--	--
SS-670	-L-	171+50	14 RT	82.6 - 84.1	A-6 (1)	30	12	21.3	40.0	10.4	28.3	--	96	86	38	--	--
SS-671	-L-	171+50	14 RT	92.6 - 94.1	A-6 (8)	33	16	13.9	23.8	17.8	44.4	--	100	92	67	--	--
ST-20 1	-L-	169+40	CL	5.5 - 7.0	A-6 (6)	33	17	18.5	30.6	12.7	38.2	--	100	96	55	--	2.9
ST-20 2	-L-	169+40	CL	5.5 - 7.0	A-7-6 (17)	55	26	13.5	22.9	7.2	56.3	--	100	97	66	--	5.0
ST-21	-L-	171+50	14 RT	5.5 - 7.6	A-7-5 (18)	58	25	14.5	21.7	13.6	50.3	--	100	96	68	--	8.0

NP - NON-PLASTIC